



Owner/Operator Manual

Mulching Mowers

- Safety
- Assembly
- Controls
- Operation
- Maintenance

Models

34020	34320
34020C	34320C
34021	34321
34021C	34321C
34022	34322
34022C	34322C
34023	34323
34311	34323C
34313	34328

TROY-BILT

Dear Owner:

You now own one of the finest mulching mowers. Your new mower provides superior mowing performance because of a multi-pitch blade, deep dome-shaped deck, and single-lever adjustment of cutting height. The self-propelled units have front wheel drive for easier handling. All models have comfortable, easy-to-use controls, and extra wide radial tires for superior traction.

Please carefully read this Manual which tells you how to safely and easily unpack, operate, and maintain your mower.

Be sure that you or any other user carefully follows the recommended safety practices at all times. Failure to do so could result in personal injury or property damage.

Of course, if you should ever have any problems or questions, or for a free replacement copy of this Manual, please call us Toll-Free. Our telephone numbers are listed on the Page 2 and on the back cover of this Manual.

Please remember, we want to make sure that you are completely satisfied at all times.

*Your Friends
at Troy-Bilt*

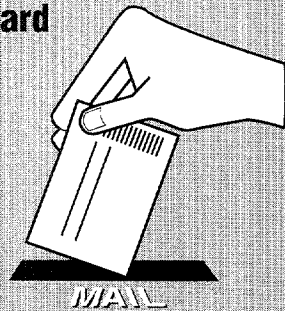
This product is certified to comply with ANSI Standard B71.1-1990. All products in this manual meet the latest CPSC blade safety requirements.



This is a safety alert symbol. It is used in this Owner/Operator Manual and on your machine to alert you to potential hazards. Whenever you see this symbol, read and obey the safety message that follows it. Failure to obey the safety message could result in personal injury or property damage.

Be Sure To Return Your Owner Registration Card

Be sure to fill out and mail your Owner Registration Card, which is located in your literature package. The information contained on the card will register your machine with us and entitle you to full coverage under our Limited Warranty.



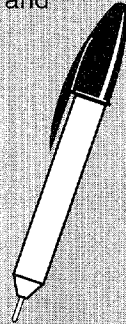
TROY-BILT FACTORY DIRECT 30-DAY TRIAL

TROY-BILT Mfg. wants you to be completely satisfied with your product. If you are not totally satisfied with the condition or performance of your TROY-BILT product, you may exchange your product or receive a refund of the purchase price of your merchandise. To receive your refund, you must contact us within 30 days after you receive your order, and follow the return instructions.

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Owner's Record

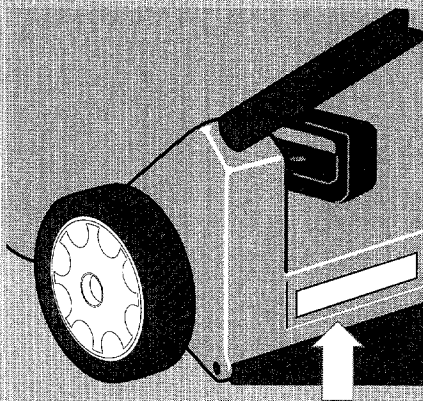
Please write the Model and Serial Numbers of your mower in the spaces provided. You can find the location of these numbers in the illustration below.



Model Number:

Serial Number:

IMPORTANT: You will need to know the **Model Number** of your machine to follow the correct instructions in this manual.



**Model/Serial
Number Decal**



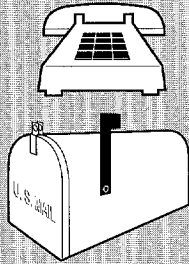
WARNING:

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

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We're at Your Service!

HOW TO REACH US



Address

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1 Garden Way
Troy, New York 12180

Hours

Mon.-Fri., 8 a.m. to 7 p.m.
Sat. 9 a.m. to 4 p.m.

Telephone Numbers

(Toll Free)

For Technical Service:
1-800-520-5520

For Parts Service:
1-800-648-6776

Outside the United States and Canada:

For Technical Service:
(518) 391-7008

All Other Inquiries:
(518) 391-7000 or
FAX (518) 233-4374

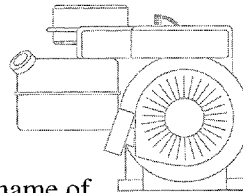


If you have any Questions or Problems...

...Please contact your local Mulching Mower authorized dealer or call or write the Factory. When calling or writing, please be sure to provide the Model and Serial Numbers of your machine (refer to Page 1).

IF YOU NEED ENGINE SERVICE:

If your engine should ever require service, repair, or parts, contact your nearest authorized engine service dealer.



To find the name of your nearest authorized engine service dealer, look in the Yellow Pages of the telephone book under "Engines-Gasoline." Call us if

you need assistance in obtaining engine service or parts.

Please remember that your engine is covered by the engine manufacturer's Limited Warranty. Any unauthorized work performed on the engine during the warranty period may void the warranty. For full details on the engine manufacturer's Limited Warranty, refer to the separate Engine Owner's Manual.

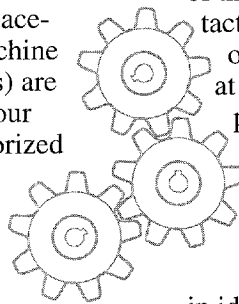
IF YOU NEED PARTS:

Factory specified replacement parts for your machine (other than engine parts) are available from either your Mulching Mower authorized dealer or directly from the Factory.

To order a part, refer to your separate Parts Catalog to find the part number, description, and quantity

of the part you need. Then, contact your authorized dealer or call or write our Parts Department at the Factory, being sure to provide the Model and Serial Numbers of your machine.

Our trained parts specialists will gladly assist you if you have any difficulty in identifying the exact part that you need.



Section 1 Safety

Read Me First!

Please read and follow all of the safety rules in this Safety Section. Failure to comply could result in serious personal injury or property damage.

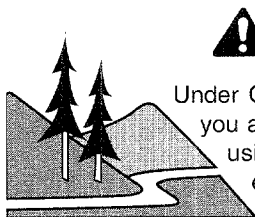
If you should lend this equipment to another person, make sure that he or she reads, understands, and always follows these safety instructions.

If you are not completely sure about any of the information found here or elsewhere in the Manual, please contact either your local authorized dealer or the Factory for assistance.



This is a safety alert symbol. It is used in this Owner/Operator Manual and on your machine to alert you to potential hazards.

Whenever you see this symbol, read and obey the safety message that follows it. Failure to obey the safety message could result in personal injury or property damage.



WARNING TO ALL CALIFORNIA AND OTHER POWER EQUIPMENT OPERATORS

Under California law, and under the laws of several other states, you are not permitted to operate an internal combustion engine using hydrocarbon fuels on any forest covered, brush covered, or grass covered land, or on land covered with grain, hay, or other flammable agricultural crop, without an engine spark arrester in continuous effective working order.

The engine on your power equipment, like most outdoor power equipment, is an internal combustion engine that burns gasoline, a hydrocarbon fuel. Therefore, your power equipment must be equipped with a spark arrester muffler in continuous effective working order. The spark arrester must be attached to the engine exhaust system in such a manner that flames or heat from the system will not ignite flammable material. Failure of the owner/operator of the equipment to comply with this regulation is a misdemeanor under California law, and may also be a violation of other state and/or federal regulations, laws, ordinances, or codes. Contact your local fire marshal or forest service for specific information about what regulations apply in your area. Contact your authorized engine dealer for information about obtaining a spark arrester.

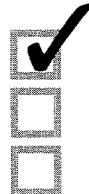
TRAINING



1. Read this Owner/Operator Manual and the separate Engine Owner's Manual carefully before operating this equipment. Be completely familiar with the controls and the proper use of this equipment.
2. Never allow children or untrained adults to operate this equipment.
3. Keep the area of operation clear of all persons, particularly small children, and pets. Keep bystanders at least 25 feet away from the area of operation.



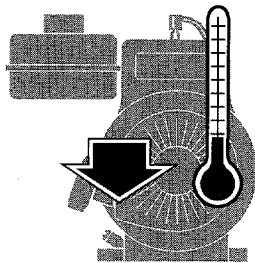
PREPARATION



1. Thoroughly inspect the area where the mower is to be used. Remove all stones, sticks, wires, bones, nails, and other foreign objects before mowing.
2. Do not operate the mower when barefoot or wearing open sandals. Always wear substantial footwear which will protect your feet and improve traction.
3. Make sure that the Wheel Drive Lever (self-propelled models except Models 34311 and 34328) is in the DISENGAGE position before starting the engine.
4. Never attempt to make a cutting height adjustment while the engine is running.
5. Do not operate this equipment if you are under the influence of alcohol, medication, or when tired or ill.

Safety

6. Check the fuel before starting the engine. Do not fill the gasoline tank indoors, when the engine is running, or until the engine has been allowed to cool for several minutes after running. The gas cap shall never be removed nor fuel added while the engine is running. Clean off any spilled gasoline before starting the engine.



7. Mow only in daylight or in good artificial light.

8. Never operate this mower in wet grass. Always be sure of your footing; keep a firm hold on the handle and walk, never run.

9. Never operate the mower without guards and all safety devices in place.

10. Never attempt to disconnect any safety devices or to defeat the purpose of these safety devices.

11. Gasoline is highly flammable and its vapors are explosive. Handle gasoline with extreme care. Use an approved fuel container.

12. Keep smoking materials, sparks, or flame away from the fuel tank and fuel container.

13. Move the mower away from any gasoline fumes before starting the engine.

14. Batteries (on electric start model) produce explosive gases. Keep sparks, flame, or cigarettes away. Ventilate the area when charging the battery.

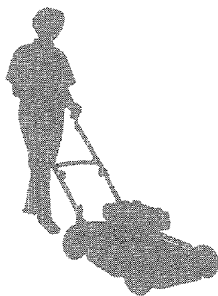
15. Do not charge the battery (electric start model) in an airtight space.

16. When charging the battery (on electric start model), do not use a battery charger other than the one provided with the mower.

17. The battery (on electric start model) contains toxic materials. Do not damage the battery case. If the case is broken or damaged, avoid contact with the battery contents.

18. Properly dispose of a damaged or worn out battery. Check with local authorities for proper disposal methods.

OPERATION



1. For all models except Blade Brake Control Models 34311 and 34328, check the operation of the Operator Presence Control Bar before each use. See the Maintenance Section of this Manual for instructions. If the blade rotates longer than **three seconds** after you release the Operator Presence Control Bar, stop the engine, disconnect the spark plug wire, and prevent the wire from touching the spark plug. Immediately contact your local service dealer or our Technical Service Department for instructions. Do not use the mower until the mechanism is repaired.

2. For Blade Brake Control Models 34311 and 34328, check the operation of the Blade Brake Control Bar and Lever before each use. See the Maintenance Section of this Manual for instructions. If the blade rotates longer than **three seconds** after you release the Blade Brake Control Bar, stop the engine, disconnect the spark plug wire, and prevent the wire from touching the spark plug. Immediately contact your local service dealer or our Technical Service Department for instructions. Do not use the mower until the mechanism is repaired.

3. Do not put hands or feet near or under any rotating parts. Keep clear of the mower blade at all times.

4. Do not tamper with the engine governor settings. The governor controls the maximum safe operating speed and protects the engine and all moving parts from damage caused by excessive speed. Authorized service should be sought if a problem exists.

5. Stop the mower blade when crossing gravel drives, walks, or roads. Wait for the blade to stop rotating.

6. Watch for traffic when operating near, or when crossing roadways.

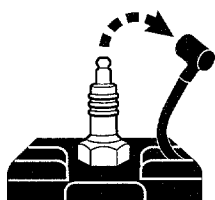
7. Never attempt to carry children or other passengers on the mower. They could fall off and be seriously injured, or they could interfere with the safe operation of the mower.

8. Keep children out of the mowing area. Keep them under the watchful eye of an adult other than the person operating the mower. Never assume that children will remain where you last saw them.

9. After striking a foreign object, stop the engine, disconnect the spark plug wire and prevent the wire from touching the spark plug. Thoroughly inspect the mower for any damage, and repair the damage before restarting and operating the mower.

10. If the mower should start to vibrate abnormally, stop the engine, disconnect the spark plug wire and prevent it from touching the spark plug. Also, remove the engine ignition key on electric start model. Check immediately for the cause. Vibration is generally a warning of trouble.

11. Never leave the mower unattended when the engine is running. Disconnect the spark plug wire and move the wire away from the spark plug to prevent accidental starting. Remove the key on electric start model to prevent unauthorized use.



12. The mower is equipped with a safety interlock system which prevents the engine from starting or running unless the discharge cover or grass catcher is properly in-

stalled. Never attempt to disconnect or otherwise defeat this system. If the interlock system is not operating properly, shut off the engine and do not use the mower until the interlock has been repaired.

13. When cleaning, repairing, or inspecting, make certain the blade and all moving parts have stopped. Disconnect the spark plug wire and keep the wire away from the plug to prevent accidental starting. Also, remove the key on the electric start model.

14. Do not run the engine in an enclosed area. Engine exhaust contains carbon monoxide, a deadly gas that is odorless, colorless, and tasteless. Always run the engine outdoors and make sure there is adequate ventilation.

15. Before installing or emptying the optional grass catcher, shut engine off, remove the key (electric start model), wait until the blade comes to a complete stop, disconnect spark plug wire and prevent it from touching spark plug.



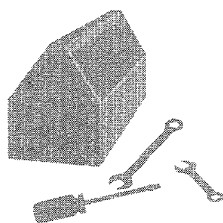
16. When using the optional grass catcher, do not operate the mower if the grass catcher is not securely attached.

17. Empty the grass catcher bag after each use. Decomposing debris could generate enough heat to catch fire.

18. Do not touch engine parts which may be hot from operation. Allow parts to cool completely before inspecting, cleaning, or repairing the mower.

19. Mow across the face of slopes, never up and down. Exercise extreme caution when changing direction on slopes. Avoid slopes greater than 15°. **Do not mow excessively steep slopes.**

MAINTENANCE AND STORAGE



1. Check the blade and the engine mounting bolts at frequent intervals for proper tightness.

2. Keep all nuts, bolts, and screws tight to ensure that the mower is in safe working condition.

3. To access the underside of the mower, tip the mower rearward. Do not tip the mower forward or on either of its sides, unless specifically advised to do so in this manual.

4. When equipment is stopped for servicing, inspection, storage, or to empty or install the grass catcher, disconnect the spark plug wire and remove the key on the electric start model. Allow the engine to cool.

5. Never store the mower with gasoline in its tank inside a building where fumes may reach an open flame or spark. Allow the engine to cool before storing it in any enclosure.

6. To reduce fire hazard, keep the engine free of grass, leaves, or excessive grease.

7. Store gasoline in a cool, well-ventilated area, safely away from any spark- or flame-producing equipment. Store gasoline in an approved container, safely out of the reach of children.

8. Do not allow children to be near you when you are working on the mower.

9. Store equipment where children will not have access to it. Disconnect the spark plug wire and remove the key on the electric start model.

10. Use only original-equipment replacement parts. Parts manufactured by others could present safety hazards even though they may fit on this mower.

11. Maintain or replace safety and instructional decals as necessary. (See the mower's Parts Catalog for location of decals and replacement information.)

12. Remember, the end of the mowing season is a good time to inspect your mower and order any replacement parts.

SAFETY DECALS

Make certain that all safety decals on this equipment are kept clean and in good condition. The decals are shown (at reduced sizes) below. If you need a replacement decal, please refer to the Parts Catalog that accompanied this Manual.

⚠ WARNING

TO AVOID SERIOUS INJURY READ ALL SAFETY PRECAUTIONS CAREFULLY.

- Read owner-operator manual.
- Do not mow when children or others are near.
- Do not allow children or untrained adults to operate machine.
- Keep all safety devices in place and in working order.
- Use caution when approaching obstacles that block your view.
- Look down and behind before and while moving backwards.

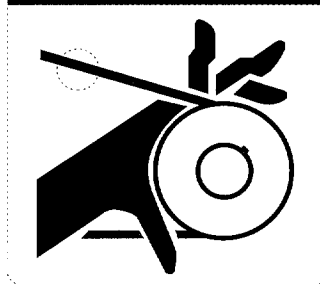
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On Rear Cover

⚠ CAUTION

PINCH POINTS.

Do not operate without all belt guards in place.

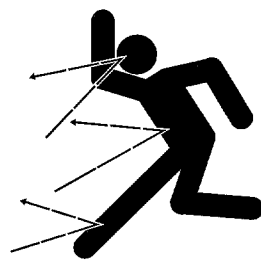


Under Front Cover
(Self-propelled Models)

⚠ WARNING

OBJECTS MAY BE THROWN FROM MOWER.

- Before mowing, clear lawn of all debris.



Rear Right Side of Deck

⚠ DANGER

Do not operate without all guards in place.

Under Discharge Cover



On Left Side of Deck

Section

2

Assembly

Read Me First!

Please carefully follow the instructions in this Section to properly adjust the handlebars on your new machine. Remember that motor oil must be added to the engine before starting.



WARNING

To prevent personal injury or property damage, do not attempt to start the engine until all assembly steps are complete and you have read and understand the safety and operating instructions in this Manual.

Tools/Supplies Needed:

- Knife (to cut plastic tie strap)
- Two 7/16" Wrenches (for Models 34311 & 34328 only)
- Motor Oil (see Engine Owner's Manual for oil specifications)
- Funnel

NOTE: All references to left, right, front and rear of the machine are determined by standing behind the handlebars and facing the direction of forward travel.

INSPECTION AFTER DELIVERY

After delivery, immediately inspect your mower. Make sure that neither the carton nor the contents has been damaged.

If you find or suspect any damage, contact the carrier (trucking company) right away. Inform them of the specific damage and that you

wish to file a claim. To protect your rights, be sure to put this in writing to the carrier within 15 days after your machine arrives. The carrier will let you know how to proceed with your claim. Please let us know if you need any assistance with this matter.

STEP 1: Unpack Mower

A. The mower is shipped fully assembled with the handlebars folded compactly for shipment.

B. After unpacking the mower, follow Steps 2 through 7 to ready the mower for use.

IMPORTANT: Motor oil must be added to the engine before it is started. See Step 6 of this Section.

Step 2: Unfold and Secure Lower Handlebars

A. Remove the locking square bail pin (B, Figure 2-1) from the left and right-side handlebar mounting brackets by unhooking the wire bail from the inside end of each pin. Set the bail pins aside.

B. As shown in Figure 2-2 on Page 8, swing the handlebar assembly (do not unfold upper section) to the rear of the mower until the handlebars rest in the handlebar mounting bracket channels (A, Figure 2-1).

NOTE: Do not pinch any cables while unfolding and securing the handlebars.

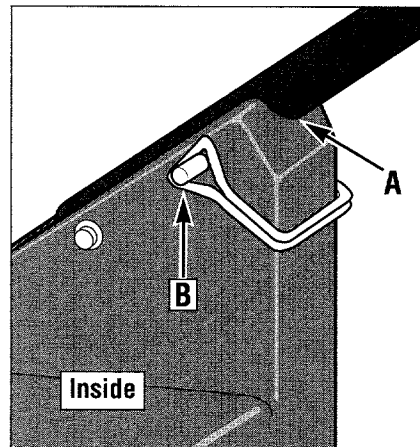


Figure 2-1: Handlebar channel and locking pins.

C. Secure the handlebars with the locking square bail pins (B, Figure 2-1). Rotate each pin so that the square bail is toward the rear of the mower. Lock the wire bail over the end of the pin as shown.

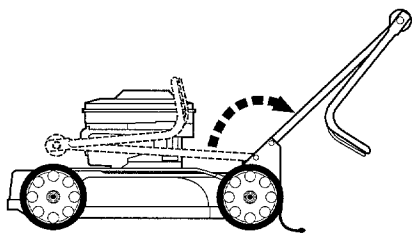


Figure 2-2: Unfold lower handlebar assembly.

Step 3: Unfold and Secure Upper Handlebars

NOTE: On some models the upper adjustment knobs (A, Figure 2-3) are located on the inside of the handlebars.

A. Loosen the upper adjustment knobs (A, Figure 2-3) until the adjustment teeth are disengaged. Push outward on the sides of the upper handlebars, and swing the handlebars upward to the desired height setting.

B. Align the adjustment teeth and tighten the knobs.

C. Remove the plastic tie strap and any cardboard wrapping from the handlebars.

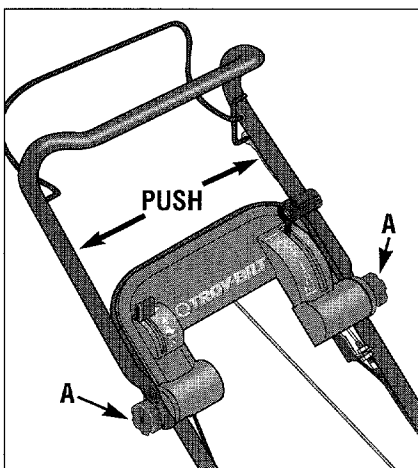


Figure 2-3: Handlebar position adjustment (Model 34022 shown).



CAUTION

Sharp cutting blades can cause serious personal injury. When working near the mower blade, wear heavy leather gloves to protect yourself from the sharp edges.

Step 4: Connect Battery Wires and Charge Battery (Models 34023, 34023C, 34323 and 34323C)

A. Carefully lift right side of mower so mower rests on left side.

B. Two wires (A and B, Figure 2-4) are located inside the right rear corner of the deck.

NOTE: Be sure both wires are *above* wheel axle before snapping the two connectors together.

C. Connect wire lead from battery (A, Figure 2-4) to wire lead from main wire harness (B). Position wires toward top of deck.

D. Gently lower mower to the ground.

E. Initially charge battery for 24 hours before using electric starter. See battery charging instructions on Page 41.

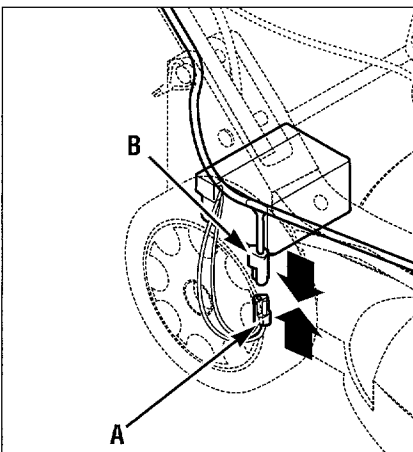


Figure 2-4: Battery wiring harness connection.

Step 5: Attach Blade Brake Control Lever (Models 34311, 34313 and 34328)

A. Remove the screw (A, Figure 2-5), nut (B) and two washers (C) from the right handlebar.

B. Position the washers against the hole in the handlebar.

C. Rotate the lever mounting bracket forward (see arrow in figure) until the slot (D) is aligned with the washers.

D. Reinstall the screw and nut and tighten them securely.

E. Tighten the screw and nut (E) at the upper part of the lever.

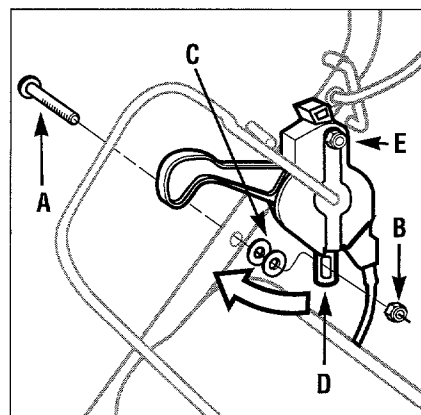


Figure 2-5: Attach Blade Brake Control Lever.

Step 6: Add Oil To Engine

A. The mower was shipped without oil which must be added before the engine is started.

B. See the Engine Owner's Manual shipped with the mower for filling instructions and for the correct oil specifications and amount for your engine.

Step 7: Perform Final Assembly Check

A. Check all nuts and bolts for tightness.

B. Be sure to read Section 3, "Features and Controls," and Section 4, "Operation," before using the mower.

Section

3

Features and Controls



Learn the location of the features and controls on your mower before starting the engine. For detailed operating instructions, please refer to "Section 4: Operation."



DANGER

**ROTATING CUTTING BLADE WILL
CAUSE SERIOUS
INJURY!**

Before inspecting or servicing any part of the machine, shut off engine, make sure that all moving parts have come to a complete stop, and disconnect spark plug wire and move it away from spark plug.

NOTE: All references to left, right, front and rear of the machine are determined by standing behind the handlebars and facing the direction of forward travel.

FEATURES AND CONTROLS IDENTIFICATION

The following are features and controls found on the various models of the Mulching Mower. Note that some are common features or controls with the same location on all models, whereas others are specific to one or more models. First, read the description and location of features on all models (Page 10). Then, look for your Model Number for a short description of the features and controls specific to your model.

All Models (see Page 10)

- Engine Recoil Starter
- Cover Interlock Switch
- Cutting Height Adjustment Handle
- Upper Handlebar Position Adjustment Knobs
- Locking Square Bail Pins (for Lower Handlebar Release)

In addition to the features mentioned above, each model has the specific features listed below:

Push Models 34020, 34020C, 34320 & 34320C (see Page 11)

- Operator Presence Control Bar (controls operation of engine & blade)
- Engine Speed Lever

Single Speed Models 34021, 34021C, 34321 & 34321C (see Page 12)

- Operator Presence Control Bar (controls operation of engine & blade)
- Engine Speed Lever
- Wheel Drive Lever

Variable Speed Models 34022, 34022C, 34322 & 34322C (see Page 13)

- Operator Presence Control Bar (controls operation of engine & blade)
- Engine Speed Lever
- Wheel Drive Lever (variable speed on panel)

Variable Speed/Electric Start Models 34023, 34323 & 34323C (see Page 14)

- Operator Presence Control Bar (controls operation of engine & blade)
- Engine Speed Lever (on panel)
- Wheel Drive Lever (variable speed on panel)
- Ignition Keyswitch (on panel)

Variable Speed/Blade Brake Control Models 34311, 34313 & 34328 (see Page 15)

- Blade Brake Control Bar (controls operation of blade)
- Engine Speed Lever
- Wheel Drive Control Bar (controls operation of wheels)
- Wheel Speed Adjustment Knob (controls forward wheel speeds)

FEATURES AND CONTROLS ON ALL MODELS

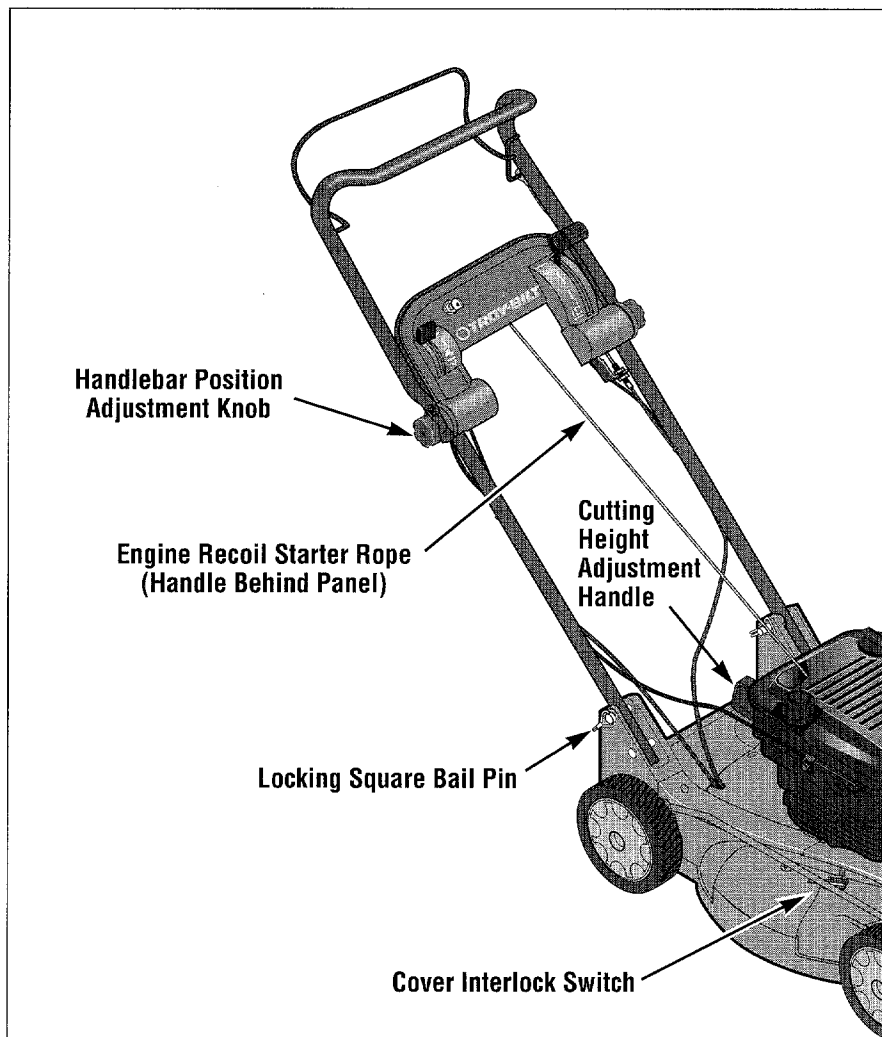


Figure 3-1: Features and controls on all models (Model 34326 shown).

Engine Recoil Starter

The Engine Recoil Starter Rope is located as shown in Figure 3-1. Operating the recoil starter is fully described in the Operation Section.

Upper Handlebar Position Adjustment Knobs

The location of the upper handlebar position adjustment knobs is shown in Figure 3-1. Adjusting the handlebars is described in the Assembly and Operation Sections. NOTE: On some models the adjustment knobs are located on the inside of the handlebars.

Cutting Height Adjustment Handle

The cutting height is changed by turning the handle (shown in Figure 3-1). Adjusting the cutting height is fully described in the Operation Section.

Locking Square Bail Pins

The locking square bail pins (shown in Figure 3-1) are used to release the lower handlebars so that the lower handlebars can be folded forward. Operation of these pins is described on Page 7. The upper handlebars can then be folded downward over the lower handlebars for purposes of transportation or storage. This procedure is described in the Maintenance Section.

Cover Interlock Switch

This mechanism (shown in Figure 3-1) prevents the engine from starting or operating unless either the discharge cover or the optional grass catcher is properly installed on the mower.

MODELS 34020, 34020C, 34320 AND 34320C (PUSH MODEL)

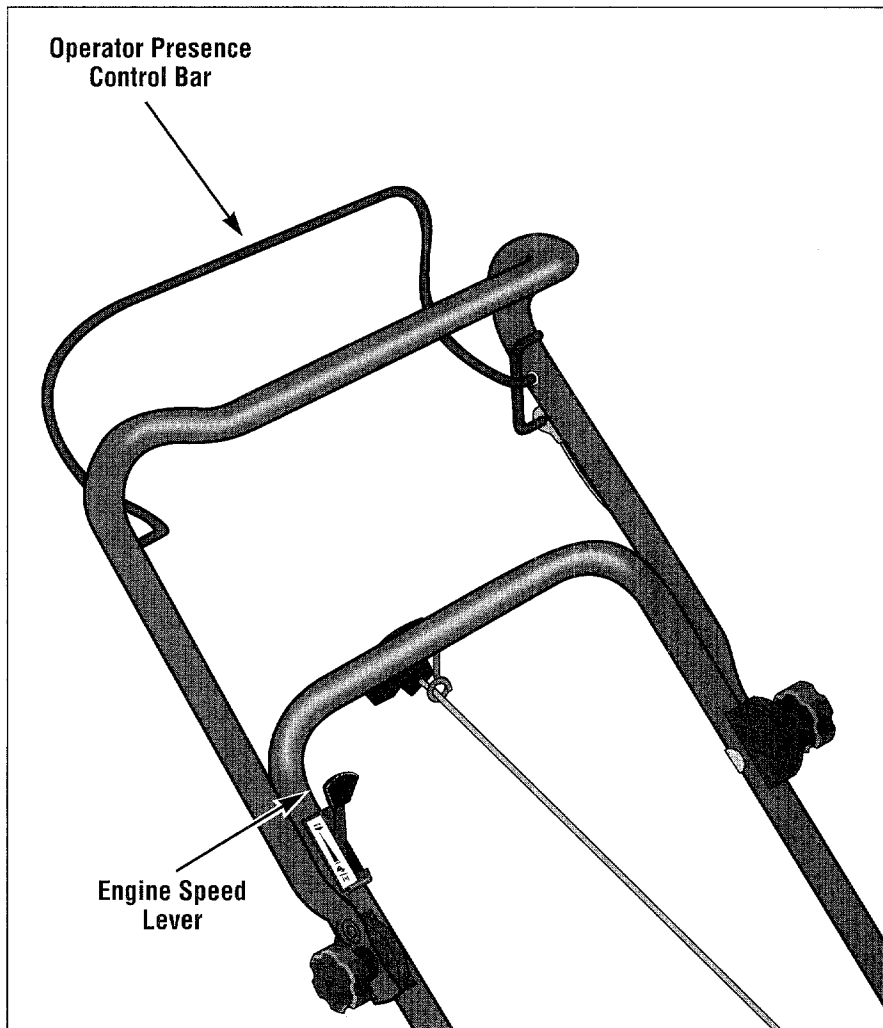


Figure 3-2: Push model.

In addition to the features and controls shown on Page 10, Models 34020, 34020C, 34320 and 34320C have the features and controls described below.

Engine Speed Lever

This control (see Figure 3-2) regulates the speed of the engine and the blade. For best mower performance, run the engine at FAST speed. Using this control is fully described in the Operation Section.

Operator Presence Control Bar

This model is equipped with an Operator Presence Control Bar (see Figure 3-2). When this control is released during mower operation, the mower engine and blade stop. Using this control is fully described in the Operation Section.

MODELS 34021, 34021C, 34321 AND 34321C (SINGLE SPEED)

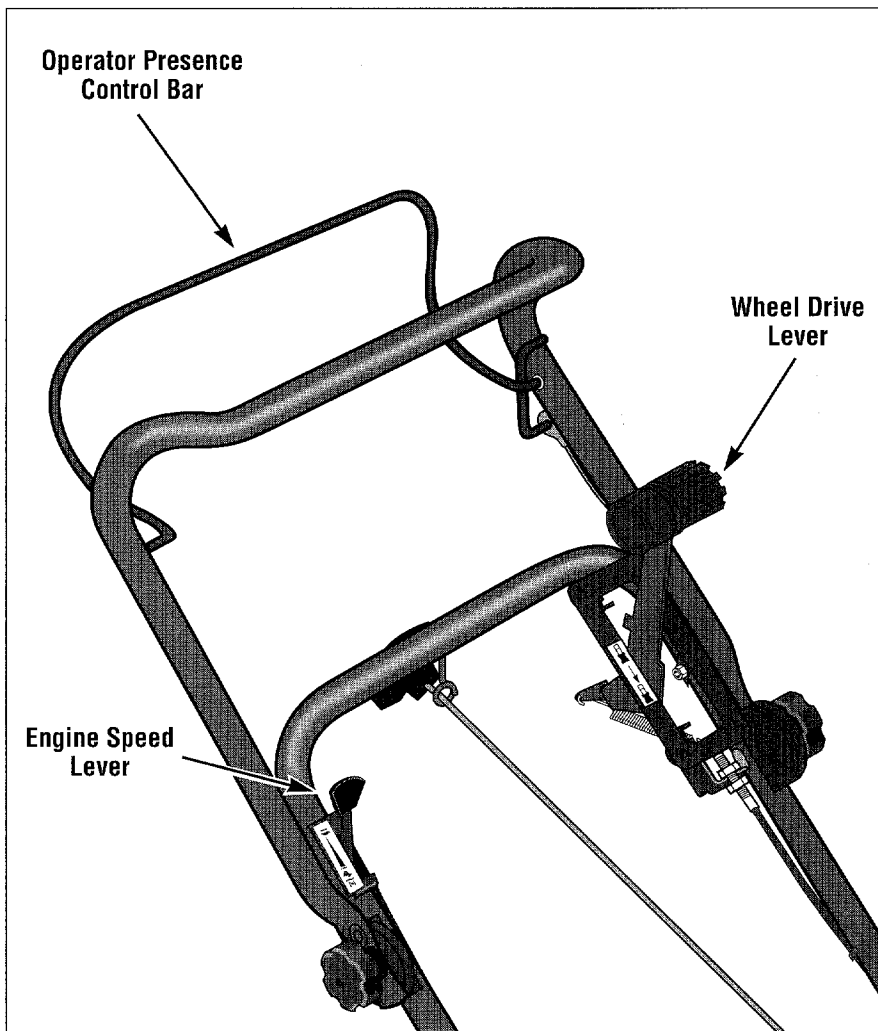


Figure 3-3: Single Speed Model.

In addition to the features and controls shown on Page 10, Models 34021, 34021C, 34321C and 34321C have the features and controls described below.

Engine Speed Lever

This control (see Figure 3-3) regulates the speed of the engine and the blade. For best mower performance, run the engine at **FAST** speed. Using this control is fully described in the Operation Section.

Operator Presence Control Bar

This model is equipped with an Operator Presence Control Bar (see Figure 3-3). When this control is released during mower operation, the mower engine, blade, and wheels stop. Using this control is fully described in the Operation Section.

Wheel Drive Lever

Move the Wheel Drive Lever (see Figure 3-3) forward to the **ENGAGE** position to turn the wheels in a forward direction. Move the lever back to the **DIS-ENGAGE** position to stop the wheels. The forward speed is set at the factory at approximately 2-1/2 mph. Using this control and changing the factory-set speed is fully described in the Operation and Maintenance Sections.

MODELS 34022, 34022C, 34322 AND 34322C (VARIABLE SPEED)

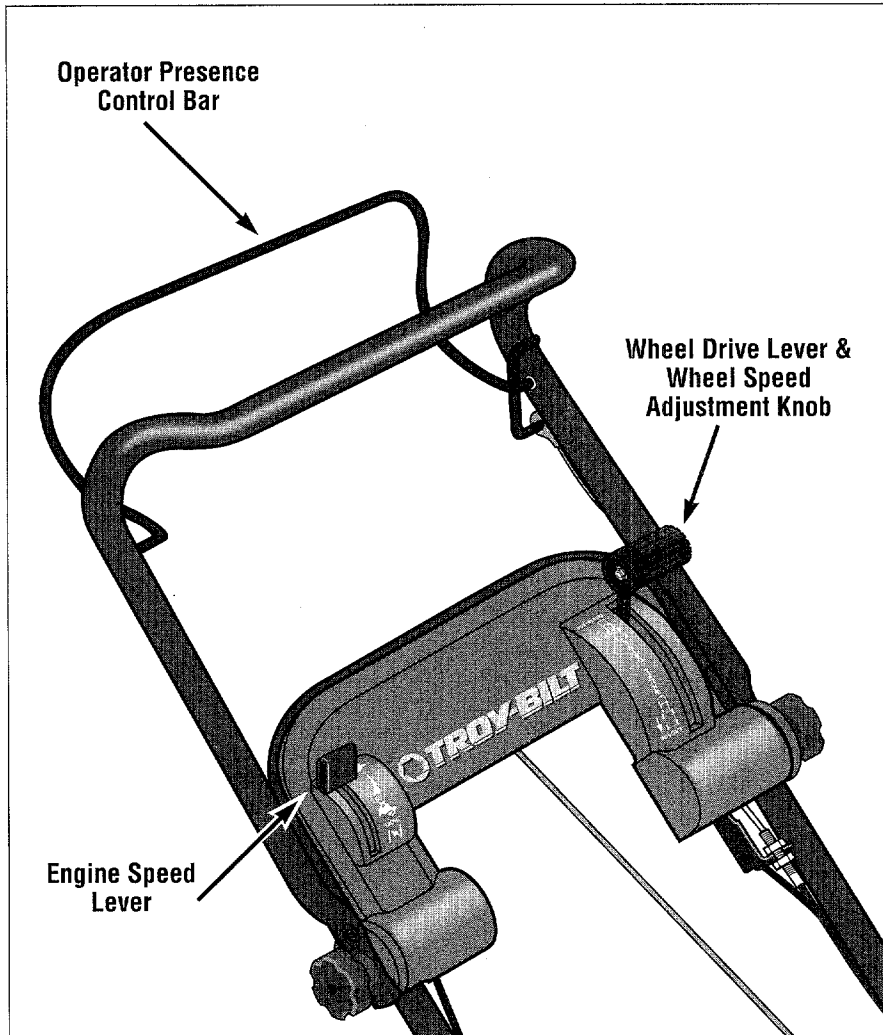


Figure 3-4: Variable Speed Model.

In addition to the features and controls shown on Page 10, Models 34022, 34022C, 34322 and 34322C have the features and controls described below.

Engine Speed Lever

This control (see Figure 3-4) regulates the speed of the engine and the blade. For best mower performance, run the engine at **FAST** speed. Using this control is fully described in the Operation Section.

Operator Presence Control Bar

This model is equipped with an Operator Presence Control Bar (see Figure 3-4). When this control is released during mower operation, the mower engine, blade, and wheels stop. Using this control is fully described in the Operation Section.

Wheel Drive Lever

The Wheel Drive Lever (shown in Figure 3-4), controls the forward speed of the mower and the engagement and disengagement of the wheel drive. The Wheel Speed Adjustment Knob has speed settings from **SLOW (1)** to **FAST (5)**. The use of this control is fully described in the Operation Section.

MODELS 34023, 34323 AND 34323C (VARIABLE SPEED WITH ELECTRIC START)

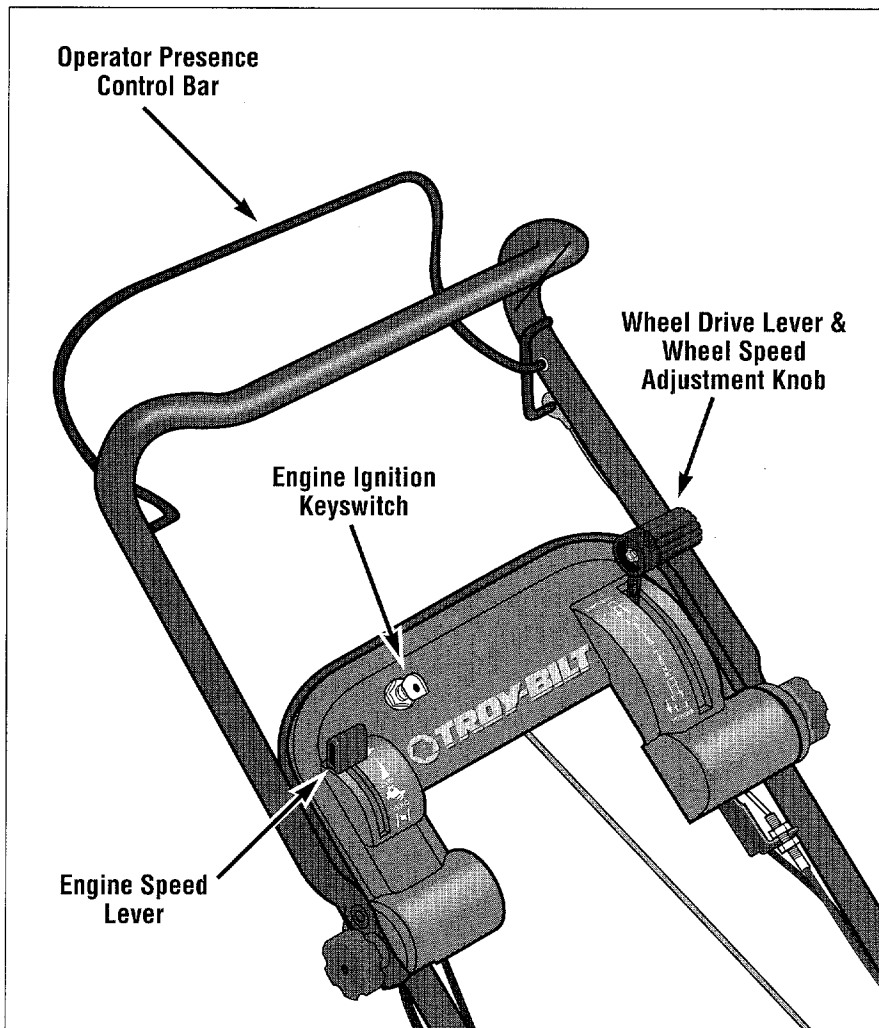


Figure 3-5: Variable Speed Model with Electric Start Engine.

In addition to the features and controls shown on Page 10, Models 34023, 34323 and 34323C have the features and controls described below.

Engine Speed Lever

This control (see Figure 3-5) regulates the speed of the engine and the blade. For best mower performance, run the engine at **FAST** speed. Using this control is fully described in the Operation Section.

Operator Presence Control Bar

This model is equipped with an Operator Presence Control Bar (see Figure 3-5). When this control is released during mower operation, the mower engine, blade, and wheels stop. Using this control is fully described in the Operation Section.

Wheel Drive Lever

The Wheel Drive Lever (shown in Figure 3-5), controls the forward speed of the mower and the engagement and disengagement of the wheel drive. The Wheel Speed Adjustment Knob has speed settings from **SLOW (1)** to **FAST (5)**. The use of this control is fully described in the Operation Section.

Engine Ignition Keyswitch

The Engine Ignition Keyswitch (shown in Figure 3-5) allows starting the engine from the handlebar panel. Starting the engine is fully described in the Operation Section.

MODELS 34311, 34313 AND 34328 (VARIABLE SPEED WITH BLADE BRAKE CONTROL)

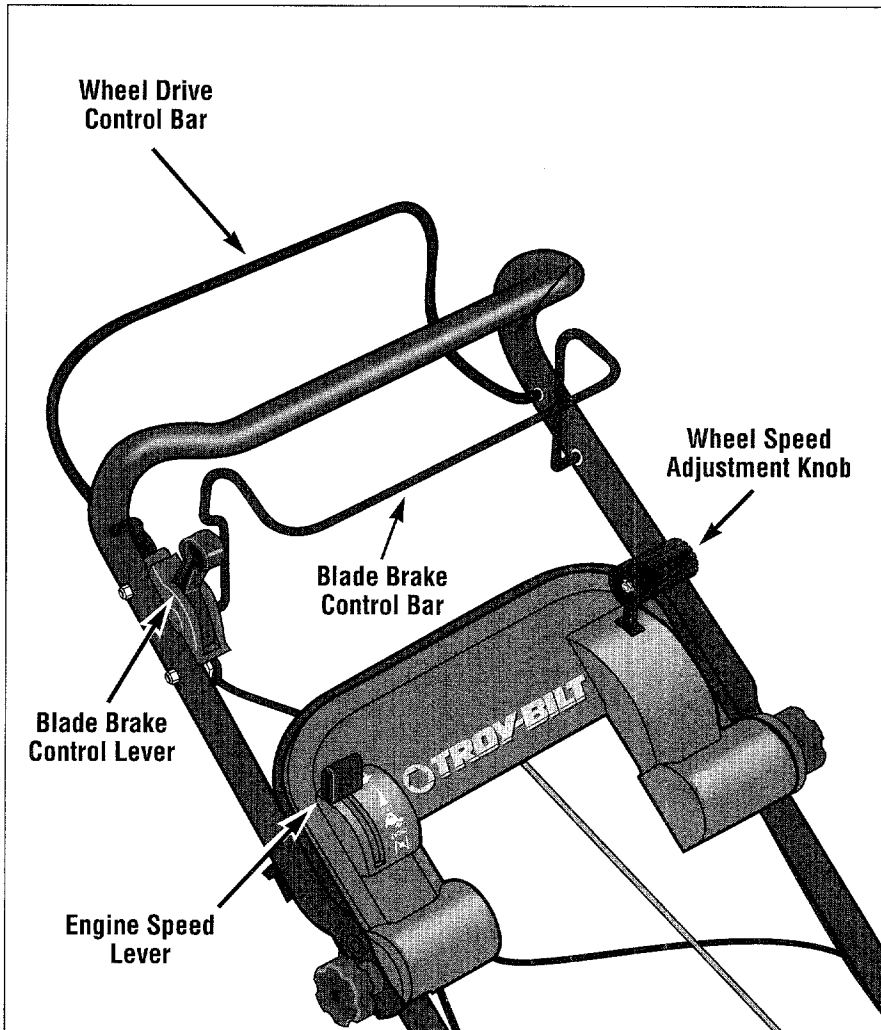


Figure 3-6: Variable Speed Model with Blade Brake Control.

In addition to the features and controls shown on Page 10, Models 34311, 34313 and 34328 have the features and controls described below.

Engine Speed Lever

This control (see Figure 3-6) regulates the speed of the engine and the blade. For best mower performance, run the engine at **FAST** speed. Using this control is fully described in the Operation Section.

Wheel Drive Control Bar

This bar (see Figure 3-6) engages the wheels and allows the mower to move forward at the speed set by the Wheel Speed Adjustment Knob.

Wheel Speed Adjustment Knob

This rotary knob (see Figure 3-6), controls the forward speed of the mower. The knob has speed settings from **SLOW (1)** to **FAST (5)**. The use of this control is fully described in the Operation Section.

Blade Brake Control Bar and Lever

The bar located in front of the handlebar is a Blade Brake Control Bar with associated Blade Brake Control Lever (see Figure 3-6). In a two step procedure, the Blade Brake Control Bar and Lever engage the blade. When the Blade Brake Control Bar is released, the Blade Brake Control Lever is automatically released. **Releasing the Blade Brake Control Bar only stops the blade and does not stop the engine.** These controls are fully described in the Operation Section.

Section

4 Operation

Read Me First!

As with any other piece of outdoor powered equipment, getting the “feel” for how your machine operates and getting to know the best techniques for particular jobs are very important to overall good performance.

Read this Section thoroughly before you start the engine. The instructions given here will help you become familiar with your machine and have you operating it efficiently in a short time.



WARNING

Before operating your machine, be sure you read and understand all safety, controls, and operating instructions in this Owner/Operator Manual and on the decals on your machine.

Failure to follow these instructions can result in serious injury or property damage.

NOTE: All references to left, right, front and rear of the machine are determined by standing behind the handlebars and facing the direction of forward travel.

This Section explains:

- Performing Pre-start Checks
- Filling the Fuel Tank
- Adjusting the Cutting Height
- Adjusting the Handlebar Height
- Safety Interlock System
- Operating the Mower
- Mowing Tips
- Using the Optional Grass Catcher

IMPORTANT: Before reading these instructions, check your mower’s Model Number to be sure that the instructions apply to your machine. Procedures which are common to all models are indicated as such.

PRE-START CHECKLIST (ALL MODELS)

- ✓ Review Section 1: Safety and Section 3: Features and Controls.
- ✓ Check the mower for loose or missing hardware. Tighten or replace before starting the mower.
- ✓ Check the engine oil level. (See the Engine Owner’s Manual for instructions.)
- ✓ Check the fuel level in the fuel tank. (See the Engine Owner’s Manual for instructions.)
- ✓ Securely attach the spark plug wire to the spark plug.
- ✓ Check the Operator Presence Control Bar (*on all Models except Models 34311 and 34328*) for freedom of movement.

- ✓ Check the Blade Brake Control Bar and Wheel Drive Control Bar (*Models 34311, 34313 and 34328 only*) for freedom of movement.
- ✓ Check the Engine Speed Lever for freedom of movement.
- ✓ Check the cutting height.
- ✓ Check the handlebar position adjustment.
- ✓ Check the Wheel Drive Lever (*on all Models except Models 34020, 34020C, 34320, 34320C, 34311, 34313 and 34328*), for freedom of movement.
- ✓ *On Models 34023, 34323 and 34323C (Electric Start)*, check the wiring harness and connectors for damage.
- ✓ Because of the safety interlock switch on all models, the engine will not start unless the discharge cover or grass catcher is properly installed.
- ✓ Check the area to be mowed and remove any debris.

FILL FUEL TANK (ALL MODELS)



DANGER

Gasoline is highly flammable and its vapors are explosive.

- Never fill the fuel tank when the engine is running or when it is still hot from operation. Allow the engine to cool at least two minutes before refueling.
- Do not allow open flames, sparks, matches, or smoking in the area.
- Fill the fuel tank outdoors in a well-ventilated area.
- Wipe up any spills and move the mower away from gasoline fumes before starting the engine.
- Securely replace the caps on the fuel tank and fuel container.
- Use only an approved fuel container. Store it safely, out of the reach of children.
- Store gasoline in a well-ventilated area. Do not store it where vapors could reach an open flame or spark, or where ignition sources (such as a hot water heaters or space heaters, furnaces, clothes dryers, stoves, electric motors, etc.) are present.

Failure to follow these instructions could result in personal injury or property damage.

- A. Unscrew the fuel tank cap.
- B. Insert a clean funnel into the fuel tank (or use a fuel container with a flexible spout).
- C. See the Engine Owner's Manual for the correct gasoline specifications for your mower's engine. Slowly fill the fuel tank leaving at least 1/2 inch of air space at the top for fuel expansion.

D. Very securely replace the fuel tank cap and the cap on the fuel container. Promptly wipe up any gasoline spills.

ADJUST CUTTING HEIGHT (ALL MODELS)



CAUTION

Before adjusting the cutting height, shut off the engine, wait for all moving parts to stop, allow the engine to cool, disconnect the spark plug wire and prevent it from touching the spark plug.

Failure to do this could result in personal injury or property damage.

Cutting Height Adjustment

The Cutting Height Adjustment positions are shown in Figure 4-1. The cutting height can be adjusted from *1/2 inch* to *3-1/2 inches*.

A. Turn the handle (A) *clockwise* to lower the blade height or *counterclockwise* to raise the blade height.

B. Numbers indicating the cutting height are located on the left side of the mower deck. See inset in Figure 4-1. (Lines between numbers indicate 1/2 inch increments.) The approximate cutting height is indicated by the line (B) on the height adjuster rod.

C. To prevent binding of the adjustment handle, periodically turn the handle through the full range of cutting height settings before finally setting the cutting height.

Variations in Cutting Height

Note that the actual cutting height of your grass may differ from the selected height settings, depending on the condition of the grass and the firmness of the ground. Also note that the cutting blade is 3/8" thick which also causes a variation in cutting height from the settings given.

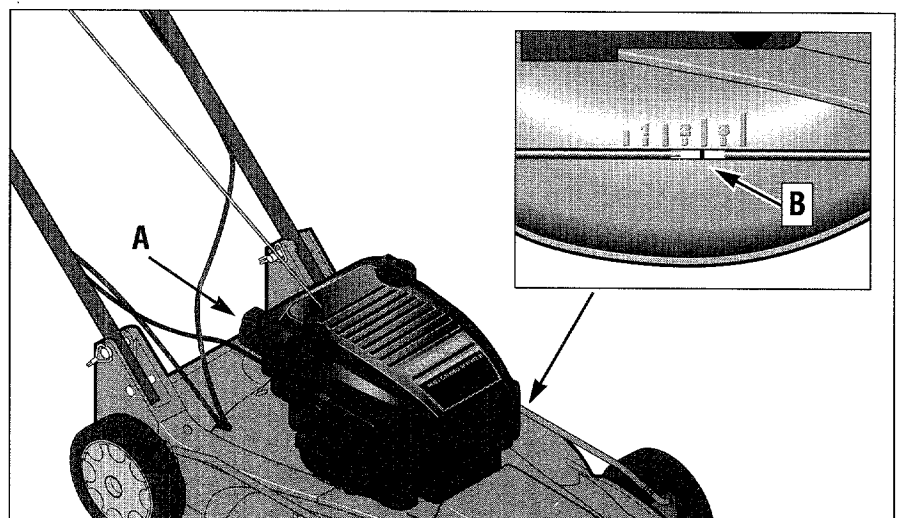


Figure 4-1: Location of Cutting Height Adjustment Handle and settings.

Operation

ADJUST HANDLEBAR POSITION (ALL MODELS)



CAUTION

Before adjusting the handlebar height, shut the engine off, wait for all moving parts to stop, allow the engine to cool, disconnect the spark plug wire, and prevent it from touching the spark plug.

Failure to do this could result in personal injury or property damage.

The handlebars are adjusted by loosening the upper adjustment knobs (see A, Figure 4-2).

NOTE: On some models the upper adjustment knobs are on the inside of the handlebars.

- A. Loosen the upper adjustment knobs (A) until the adjustment teeth are disengaged.
- B. Push outward on the sides of the upper handlebar section as shown in Figure 4-2.

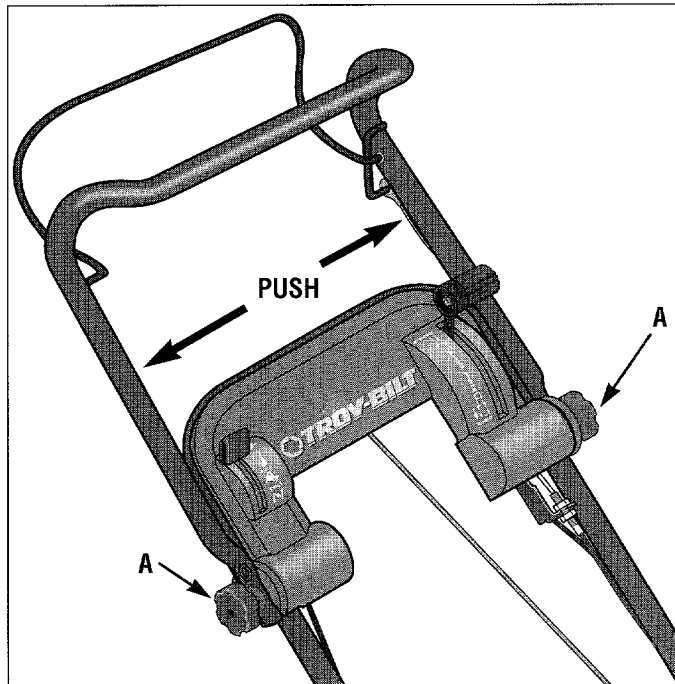


Figure 4-2: Handlebar Position Adjustment Knobs (Model 34322 shown).

- C. Move the upper handlebar to the desired position, align the adjustment teeth, and release the outward pressure.
- D. Retighten both adjustment knobs.

SAFETY INTERLOCK SYSTEM (ALL MODELS)

Your mower is equipped with a Safety Interlock System. See Figure 4-3 which shows the cover and safety interlock. This system prevents the engine from starting unless the discharge cover or optional grass catcher is properly installed. The rod (A) must be positioned as shown in the slot (B) in order to start the engine.

The system also stops the engine if the operator attempts to remove the grass catcher or discharge cover while the engine is running. When

the rod is not in place, a circuit opens to ground out the engine.

If the safety interlock system fails, shut off the engine and do not operate the machine until the system is repaired. See your local authorized dealer or call the Factory for further information.

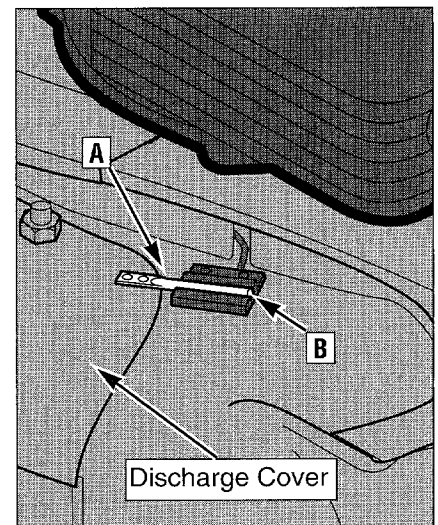


Figure 4-3: Safety Interlock System with cover installed.

OPERATING MODELS 34020, 34020C, 34320 AND 34320C (4HP PUSH MODEL)

STEP 1: General Starting

IMPORTANT: This model has an Operator Presence Control Bar which, if released during mower operation, immediately stops the engine, and stops the mower blade within three seconds. Test the operation of the Operator Presence Control Bar before each use of the mower. See the Maintenance Section for this test procedure.

A. Move the mower to a level area.

B. Connect the spark plug wire.

C. Move the Engine Speed Lever (A, Figure 4-4) past the FAST position to the **CHOKE** position.

D. Stand in the operator's position and squeeze the Operator Presence Control Bar (B, Figure 4-4) against the handlebar.

E. Firmly grasp the Recoil Starter Rope Handle (C, Figure 4-4). Slowly pull the Recoil Starter Rope Handle rearward until there is resistance from engine compression.

F. Check behind you to make sure that there are no obstacles in your way. Then, rapidly pull the Recoil Starter Rope rearward.

G. Allow the Starter Rope to slowly rewind — do not allow the Recoil Starter Rope to snap back.

H. When the engine starts, move the Engine Speed Lever (A) to the **FAST** position. The mower blade is now turning. Push the mower forward to begin mowing.

STEP 2: Stopping

Release the Operator Presence Control Bar (B). This will stop the engine and stop the mower blade within three seconds.



WARNING

If the Operator Presence Control System does not operate properly, the blade could continue to rotate for longer than three seconds after the Operator Presence Control Bar is released. If this occurs, stop the engine, disconnect the spark plug wire and move it away from the spark plug. Immediately contact your local authorized dealer or the Factory for instructions. Do not operate the mower until the Operator Presence Control System is repaired.

Failure to do this could result in personal injury or property damage.

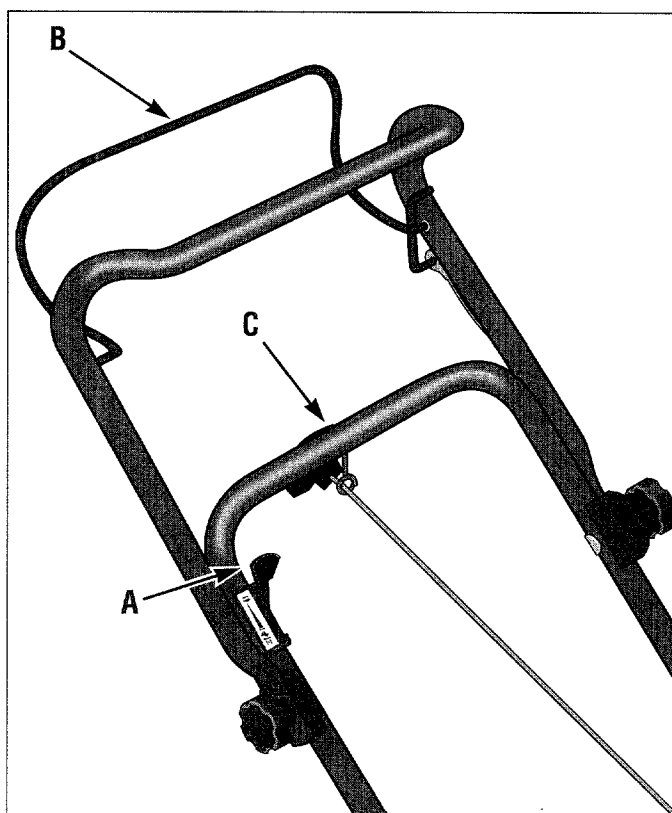


Figure 4-4: Operating controls on Models 34020, 34020C, 34320 and 34320C.

OPERATING MODELS 34021, 34021C, 34321 AND 34321C (SINGLE SPEED)

STEP 1: General Starting

IMPORTANT: This model has an Operator Presence Control Bar which, if released during mower operation, immediately stops the engine, stops the wheels, and stops the mower blade within three seconds. Test the operation of the Operator Presence Control Bar before each use of the mower. See the Maintenance Section for this test procedure.



WARNING

Before starting the engine and after stopping the mower, the Wheel Drive Lever must be moved to the DISENGAGE position. This ensures that the mower will not accidentally move forward when the engine is started.

Failure to do this could result in personal injury or property damage.

- A. Move mower to a level area.
- B. Connect the spark plug wire.
- C. Move the Wheel Drive Lever (D, Figure 4-5) back to the DISENGAGE position.
- D. Move the Engine Speed Lever (A in Figure 4-5) forward past the FAST position to the CHOKE position.
- E. Stand in the operator's position and squeeze the Operator Presence Control Bar (B) against the handlebar.
- F. Firmly grasp the Recoil Starter Rope Handle (C, Figure 4-5). Slowly pull the Recoil Starter Rope Handle rearward until there is resistance from engine compression.
- G. Check behind you to make sure that there are no obstacles in your way. Then, rapidly pull the Recoil Starter Rope rearward.
- H. Allow the Starter Rope to slowly rewind — do not allow the Recoil Starter Rope to snap back.

I. When the engine starts, move the Engine Speed Lever (A) to the FAST speed setting. The mower blade is now turning.

STEP 2: Operation

- A. Move the Wheel Drive Lever (D) forward to the ENGAGE position. The mower will move forward.
- B. To change the wheel speed (pre-set to approximately 2-1/2 mph), refer to the wheel speed adjustment procedure in the Maintenance Section.

STEP 3: Stopping

- A. Move the Wheel Drive Lever back to the DISENGAGE position to stop the wheels.
- B. Release the Operator Presence Control Bar. This will stop the engine and stop the mower blade within three seconds.

NOTE: To stop the mower in an emergency, merely release the Operator Presence Control Bar.

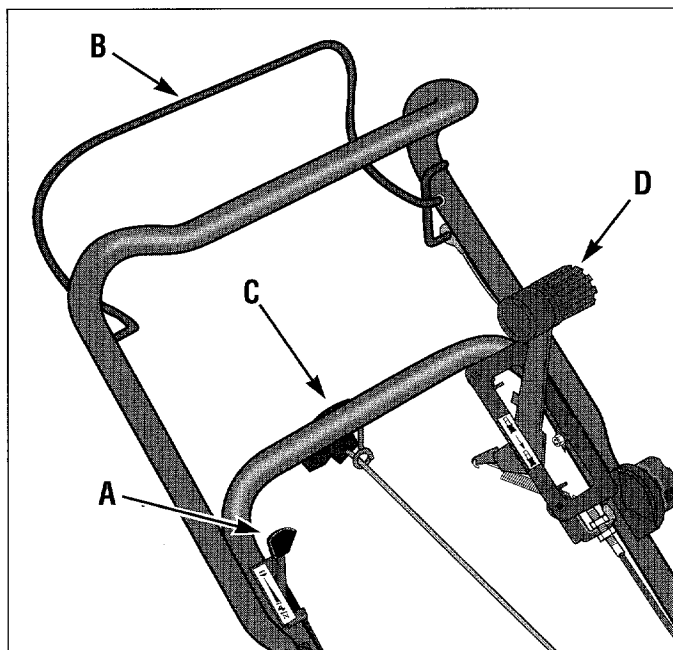


Figure 4-5: Operating controls on Models 34021, 34021C, 34321 and 34321C.



WARNING

If the Operator Presence control System does not operate properly, the blade could continue to rotate for longer than three seconds after the Operator Presence Control Bar is released. If this occurs, stop the engine, disconnect the spark plug wire and move it away from the spark plug. Immediately contact your local authorized dealer or the factory for instructions. Do not operate the mower until the Operator Presence Control System is repaired.

Failure to do this could result in personal injury or property damage.

OPERATING MODELS 34022, 34022C, 34322 AND 34322C (VARIABLE SPEED WITH RECOIL START)

STEP 1: General Starting

IMPORTANT: This model has an Operator Presence Control Bar which, if released during mower operation, immediately stops the engine, stops the wheels, and stops the mower blade within three seconds. Test the operation of the Operator Presence Control Bar before each use of the mower. See the Maintenance Section for this test procedure.



WARNING

Before starting the engine and after stopping the mower, the Wheel Drive Lever must be moved to the DISENGAGE position. This ensures that the mower will not accidentally move forward when the engine is started.

Failure to do this could result in personal injury or property damage.

- A. Move mower to a level area.
- B. Connect the spark plug wire.
- C. Move the Wheel Drive Lever (A, Figure 4-6) back to the **DISENGAGED** position.
- D. Move the Engine Speed Lever (B, Figure 4-6) forward past the **FAST** position to the **CHOKE** position.
- E. Stand in the operator's position and squeeze the Operator Presence Control Bar (C) against the handlebar.
- F. Firmly grasp the Recoil Starter Rope Handle (D, Figure 4-6). Slowly pull the Recoil Starter Rope Handle rearward until there is resistance from engine compression.
- G. Check behind you to make sure that there are no obstacles in your way. Rapidly pull the Recoil Starter Rope rearward.

H. Allow the Starter Rope to slowly rewind — do not allow the Recoil Starter Rope to snap back.

I. When the engine starts, move the Engine Speed Lever (B) to the **FAST** position. The mower blade is now turning.



WARNING

If the Operator Presence control System does not operate properly, the blade could continue to rotate for longer than three seconds after the Operator Presence Control Bar is released. If this occurs, stop the engine, disconnect the spark plug wire and move it away from the spark plug. Immediately contact your local authorized dealer or the factory for instructions. Do not operate the mower until the Operator Presence Control System is repaired.

Failure to do this could result in personal injury or property damage.

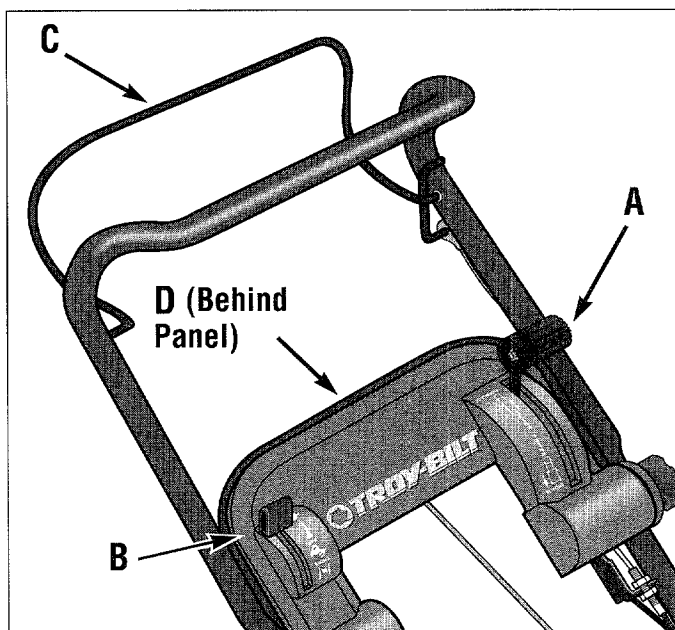


Figure 4-6: Operating controls on Models 34022, 34022C, 34322 and 34322C.

STEP 2: Operation

A. To select a mowing speed, first move the Wheel Drive Lever (A, Figure 4-6) all the way back to the **DISENGAGE** position.

NOTE: When *changing the speed of the mower*, always move the Wheel Drive Lever (A, Figure 4-6) back to the **DISENGAGE** position to de-clutch the wheel drive mechanism before turning the Wheel Speed Adjustment Knob.

(Continued on next page)

B. Turn the Wheel Speed Adjustment Knob (on end of lever) until the arrow on the knob points to the desired setting: **1** (*slow*) to **5** (*fast*). See Figure 4-7.

C. Move the Wheel Drive Lever forward to engage the wheels and begin mowing.

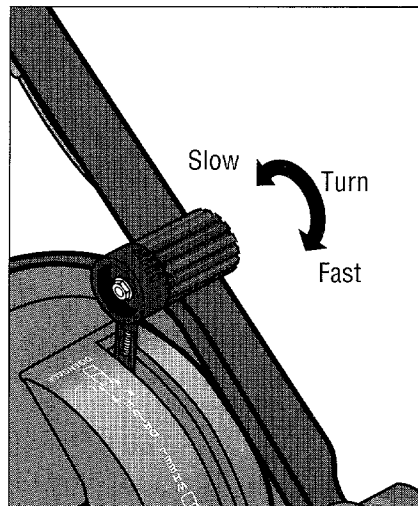


Figure 4-7: To set wheel speed, put Wheel Speed Lever in DISENGAGE position and turn adjustment knob to desired speed setting.

STEP 3: Stopping

A. Move the Wheel Drive Lever back to the **DISENGAGE** position to stop the wheels.

B. Release the Operator Presence Control Bar. This will stop the engine and stop the mower blade within three seconds.

NOTE: To stop the mower in an emergency, merely release the Operator Presence Control Bar.

IMPORTANT: Always store the mower with the Wheel Drive Lever in **DISENGAGE** and with the knob in one (**1**) to prevent accidentally starting the mower at a **FAST** wheel speed.

OPERATING MODELS 34023, 34323 & 34323C (VARIABLE SPEED WITH ELECTRIC START)

STEP 1: General Starting

IMPORTANT: This model has an Operator Presence Control Bar which, if released during mower operation, immediately stops the engine, stops the wheels, and stops the mower blade within three seconds. Test the operation of the Operator Presence Control Bar before each use of the mower. See the Maintenance Section for this test procedure.



WARNING

Before starting the engine and after stopping the mower, the Wheel Speed Lever must be moved to the DISENGAGE position. This ensures that the mower will not accidentally move forward when the engine is started.

Failure to do this could result in personal injury or property damage.

- A. Move mower to a level area.
- B. Connect the spark plug wire.
- C. Move the Wheel Drive Lever (A, Figure 4-8) back to the DISENGAGE position.
- D. Move the Engine Speed Lever (B, Figure 4-8) forward past the FAST position to the CHOKE position.
- E. Stand in the operator's position and squeeze the Operator Presence Control Bar (C) against the handlebar.
- F. Put the ignition key (E, Figure 4-8) in the keyswitch and turn the key to the right to the START position. Use short starting cycles of 15 seconds to avoid damaging the starter motor.
- G. When the engine starts, release the key. It will automatically return to the RUN position. The mower blade is now turning.
- H. Move the Engine Speed Lever (B) to the FAST setting.

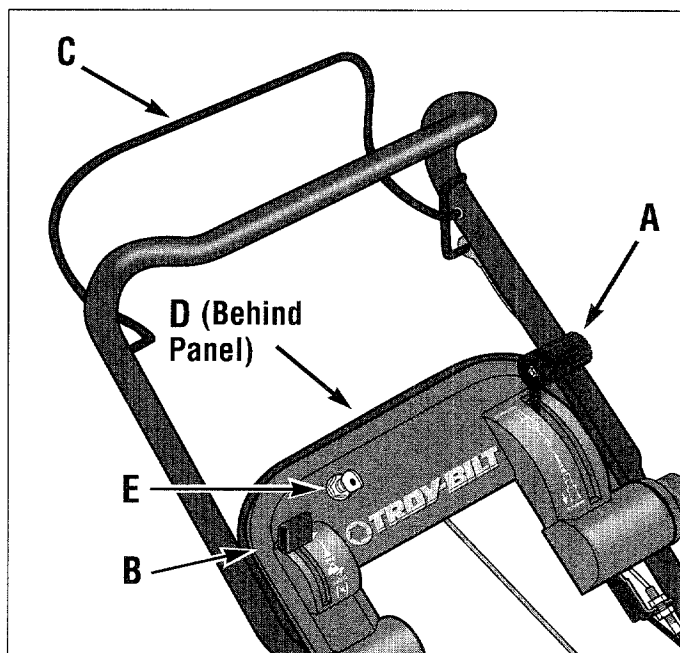


Figure 4-8: Operating controls on Models 34023, 34323 and 34323C.



WARNING

If the Operator Presence control System does not operate properly, the blade could continue to rotate for longer than three seconds after the Operator Presence Control Bar is released. If this occurs, stop the engine, disconnect the spark plug wire and move it away from the spark plug. Immediately contact your local authorized dealer or the factory for instructions. Do not operate the mower until the Operator Presence Control System is repaired.

Failure to do this could result in personal injury or property damage.

NOTE: If problems exist with the electric start system, the mower can also be started by using the Recoil Starter Rope as described below.

Manual Starting:

- A. Follow Steps A through E of "General Starting."
- B. Firmly grasp the Recoil Starter Rope Handle (D, Figure 4-8). Slowly pull the Recoil Starter Rope Handle rearward until there is resistance from engine compression.
- C. Check behind you to make sure that there are no obstacles in your way. Rapidly pull the Recoil Starter Rope rearward.
- D. Allow the Starter Rope to slowly rewind — do not allow the Recoil Starter Rope to snap back.
- E. When the engine starts, move the Engine Speed Lever (B) to the FAST position. The mower blade is now turning.

Operation

STEP 2: Operation

A. To select a mowing speed, first move the Wheel Drive Lever (A, Figure 4-8) to the **DISENGAGE** position.

NOTE: When *changing the speed of the mower*, always move the Wheel Drive Lever (A, Figure 4-8) back to the **DISENGAGE** position to de-clutch the wheel drive mechanism before turning the Wheel Speed Adjustment Knob.

B. Turn the Wheel Speed Adjustment Knob (on end of lever) until the arrow on the knob points to the desired setting: **1 (slow)** to **5 (fast)**. See Figure 4-9.

C. Move the Wheel Drive Lever forward to engage the wheels and begin mowing.

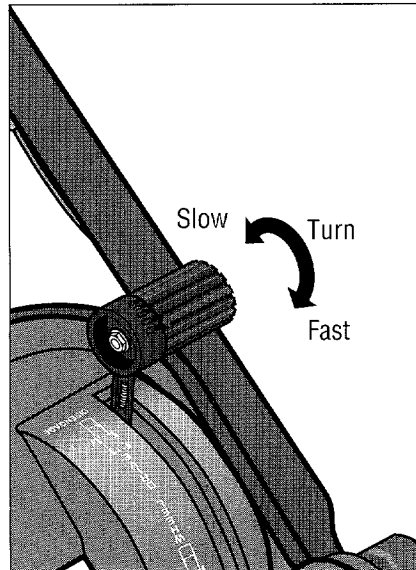


Figure 4-9: To set wheel speed, put Wheel Speed Lever in **DISENGAGE** position and turn adjustment knob to desired speed setting.

STEP 3: Stopping

A. Move the Wheel Drive Lever back to the **DISENGAGE** position to stop the wheels.

B. Release the Operator Presence Control Bar. This will stop the engine and stop the mower blade within three seconds.

C. Turn the ignition key to **OFF**. Remove the key before storing the mower or leaving it unattended.

NOTE: To stop the mower in an emergency, merely release the Operator Presence Control Bar.

IMPORTANT: Always store the mower with the Wheel Drive Lever in **DISENGAGE** and with the knob in one (**1**) to prevent accidentally starting the mower at a **FAST** wheel speed.

OPERATING MODELS 34311, 34313 AND 34328 (VARIABLE SPEED WITH BLADE BRAKE CONTROL)

STEP 1: General Starting

IMPORTANT: This model is equipped with a Blade Brake Control System which allows engine to run and wheels to move mower forward without mower blade rotating. See F in Figure 4-10 which is Blade Brake Control Bar. Test operation of Blade Brake Control Bar before each use of mower. See Maintenance Section for test procedure.

- A. Move mower to a level area.
- B. Connect the spark plug wire.
- C. Check that the Wheel Drive Control Bar (C, Figure 4-10) is in the **DISENGAGE** (released) position.
- D. Move the Engine Speed Lever (B, Figure 4-10) forward past the **FAST** position to the **CHOKE** position.

IMPORTANT: If restarting a warm engine, **DO NOT** put the Engine Speed Lever in the **CHOKE** position.

- E. Make sure that the Blade Brake Control Bar (F, Figure 4-10) is in the **DISENGAGE** (released) position.
- F. Firmly grasp Recoil Starter Rope Handle (D, Figure 4-10).
- G. Check behind you to make sure that there are no obstacles in your way. Slowly pull the Recoil Starter Rope Handle rearward until there is resistance from engine compression.
- H. Rapidly pull the Recoil Starter Rope rearward.
- I. Allow the Starter Rope to slowly rewind — do not allow the Recoil Starter Rope to snap back.

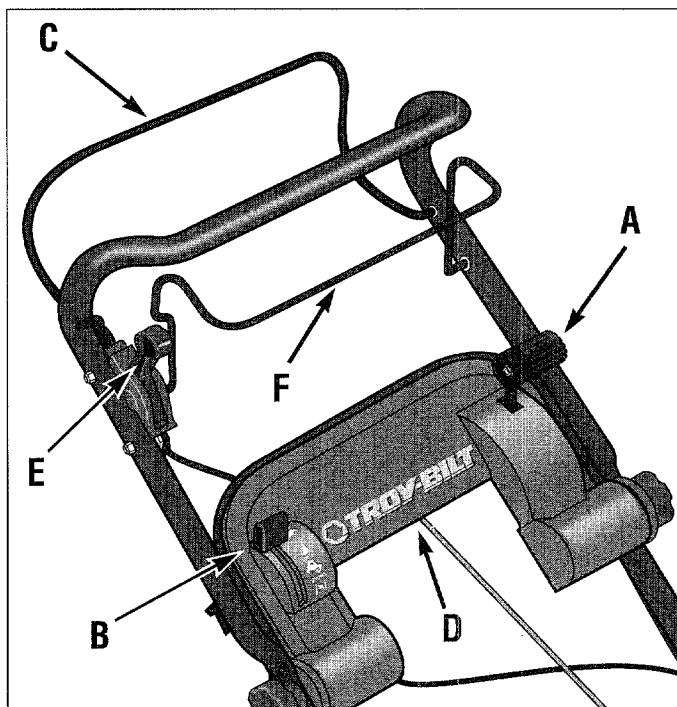


Figure 4-10: Operating Controls on Models 34311 and 34328.



WARNING

- To avoid personal injury, do not engage the Wheel Drive Control Bar until you are ready to transport the mower under engine power or until you are ready to begin mowing.
 - To avoid personal injury do not engage the Blade Brake Control Bar until you are ready to begin mowing.
- Failure to do this could result in personal injury or property damage.

STEP 2: Operation

- A. When the engine starts, move the Engine Speed Lever (B) to the **FAST** speed setting.
- B. Before selecting a mowing speed, put the Wheel Drive Control Bar (C) in the **DISENGAGE** (released) position.

Changing Mower Forward Speed and Engaging Wheel Drive:

- A. Turn the Wheel Speed Adjustment Knob (A, Figure 4-10) until the arrow on the knob points to the desired setting: 1 (*slow*) to 5 (*fast*). See Figure 4-11.

(Continued on next page)

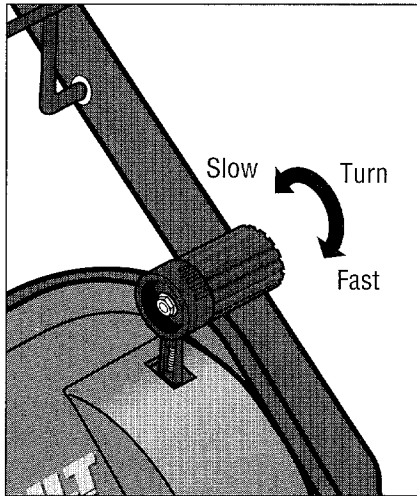


Figure 4-11: Operating the Wheel Speed Adjustment Knob.

B. Push the Wheel Drive Control Bar (C, Figure 4-12) up against the handlebar. The mower will move forward at the selected speed.

To Start Blade Rotation:

A. To start the mower blade rotating, pull the Blade Brake Control Bar (F, Figure 4-12) up against the handlebar.

B. Then push the Blade Brake Control Lever (E) forward until the lever latches into place in the forward position. The mower blade is now rotating.

NOTE: The blade will rotate only while the Blade Brake Control Bar is up against the handlebar and the lever is latched in the forward position.

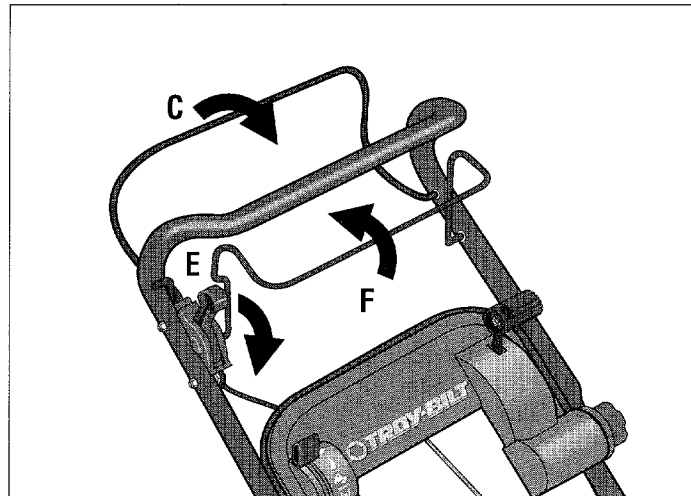


Figure 4-12: Wheel Drive/Blade Brake Control operation.



WARNING

If the Blade Brake Control System does not operate properly, the blade could continue to rotate for longer than three seconds after the Blade Brake Control Bar is released. If this occurs, stop the engine, disconnect the spark plug wire and move it away from the spark plug. Immediately contact your local authorized dealer or the factory for instructions. Do not operate the mower until the Blade Brake Control System is repaired.

Failure to do this could result in personal injury or property damage.

STEP 3: Stopping

To Stop Blade Rotation:

Release the Blade Brake Control Bar (F, Figure 4-12). Doing so automatically disengages the Blade Brake Control Lever (E), and the mower blade stops within three seconds.

IMPORTANT: Releasing the Blade Brake Control Bar stops only the mower blade. If the Wheel Drive Control Bar (C) is ENGAGED, the mower will continue to move forward.

To Stop Forward Movement of Mower:

Let go of the Wheel Drive Control Bar (C, Figure 4-12) to stop the wheels.

To Stop the Engine:

Move the Engine Speed Lever to the STOP position shown in Figure 4-13.

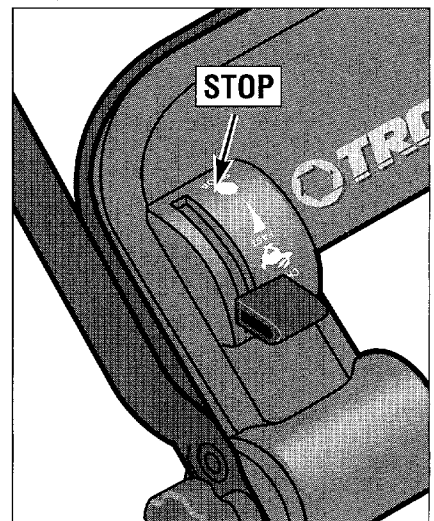


Figure 4-13: Engine Speed Lever STOP position.

MOWING TIPS AND HINTS

Mow When Lawn Is Dry

Avoid mowing grass when it is wet. Wet grass is more difficult to mow and may result in an uneven cut. Plus, wet clippings tend to stick together in unsightly clumps on top of the lawn, rather than sifting down and out of sight into the turf.

Avoid Midday Mowing

If possible, mow in the late afternoon or early evening to avoid exposing newly cut grass to the drying effects of direct sunlight.

Disengage Wheels When Trimming

On self-propelled models, disengage the wheels and gently push the mower to cut near obstacles.

Never Remove More Than 1/3 of Grass Blades

If possible, mow often enough or high enough to avoid cutting off more than 1/3 of the grass blade length. For example, if you are maintaining your lawn at 2 inches, mow before it reaches 3 inches.

Removing more than 1/3 may expose tender, shaded stems to the drying effects of sun and wind and produce a dull, brown-looking lawn. Cutting off too much leaf area is also a shock to the root system and it may take weeks to repair the damage.

Lastly, the overabundant clippings can't filter down into the turf as readily, resulting in a lawn that looks messy.

Vary Cutting Pattern

Vary the cutting pattern from week to week. One week mow from north to south, the next week mow from east to west. This helps prevent wear patterns and soil compaction.

Also, overlap slightly when mowing to reduce wheels marks and to give your lawn a more evenly cut appearance.

Clean Mower Frequently

Clean the mowing chamber frequently to remove any grass build-up. Refer to the cleaning instructions in the Maintenance/Repairs Section of this manual.

Avoid Sharp Turns

Sharp turns may produce an uneven cut or deposit clippings at the turning point. If possible, follow natural ground contours or use gentle, sweeping turns for a better looking lawn.

When turning, unmulched grass may accumulate at turning points (tilting the mower deck reduces mulching performance). It may be necessary to mow turning points again until the clippings are no longer visible.

Mow Long Grass Twice

If the grass is 5 inches long or more, cut it once at the highest setting and then mow it again at the desired height. Use the optional Collection Bag to deal with excess clippings (well-mulched grass clippings are a great addition to a compost pile).

Use Extreme Caution on Slopes

When operating on sloping ground, exercise extreme caution and use good common sense to avoid possible personal injury or property damage.

Do not mow excessively steep slopes! Avoid slopes greater than 15 degrees, or wherever footing is unsure. If a slope is difficult to stand on it is probably too steep to mow (in that case, it may be best to establish a ground cover that doesn't require mowing).

Do not mow on slopes when the ground is wet. Mow across the face of slopes, never up and down. Slow down and exercise extreme caution when changing direction on slopes. Keep the Wheel Drive

Lever engaged on self-propelled models to ensure easier operation and better control of the mower.

Use Correct Wheel Speed

On variable speed models, adjust the wheel speed to grass conditions. Use wheel speeds 1 through 4 for normal mowing conditions. You'll get better results at slower speeds, especially if the grass is tall or lush. Use wheel speed 5 for transporting, or where the grass is light and appearance is not as important.

Keep Mower Blade Sharp

A sharp blade cuts the grass cleanly, resulting in a smooth, evenly cut lawn. A dull blade tears at the grass and will fray the tips so that they dry out quickly, resulting in a dull, brown-looking lawn.

Refer to the blade sharpening instructions in the Maintenance Section of this manual.

Mow at Full Throttle

Set the throttle at its fastest setting for best mowing performance and peak engine operating efficiency. Faster blade speeds result in a better quality cut, and the higher engine RPM helps to ensure proper cooling and oiling to engine parts.

Mulching Leaves

A light covering of leaves can be effectively mulched into the turf. As the leaves decompose, they will add valuable organic matter and minerals to the soil.

To ensure effective mulching, be sure the leaves are dry. Use a slow travel speed and don't try to mulch a deep layer of leaves.

Leaves from oak trees tend to be acidic and may affect the soil's pH level over time. If a soil test indicates acid soil, use ground limestone to help neutralize the acidity.

OPTIONAL GRASS CATCHER (ALL MODELS)

WARNING

- Before installing, emptying, or unclogging the grass catcher or boot, stop the engine and make sure that all moving parts have come to a complete stop. Disconnect the spark plug wire and move it away from the spark plug.
- Check the collection bag frequently for deterioration and wear and replace worn bags. Failure to do this could result in personal injury or property damage.
- Do not operate mower without entire grass catcher or discharge cover secured in place.

Installing Grass Catcher Boot and Bag Assembly

A. Stop engine and wait for all moving parts to stop. Disconnect spark plug wire and move it away from the spark plug.

B. Adjust cutting height to mid-range setting. Remove toplock nut (A, Figure 4-14) which secures discharge cover (B, Figure 4-14) and then remove cover.

C. Place grass catcher “boot” (C, Figure 4-14) over opening. Make sure that tab on boot is inside rim of opening on mower deck.

D. Install metal brace (F, Figure 4-15) under mower height adjuster rod on cover stud (G). Reinstall toplock nut (A).

E. Make sure safety interlock rod (H, Figure 4-15) on “boot” is securely in place in slot on mower deck.

F. Swing open boot discharge lid (I, Figure 4-16).

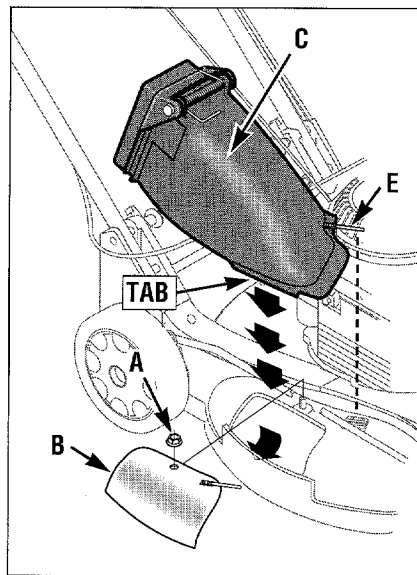


Figure 4-14: Installing Grass Catcher Boot.

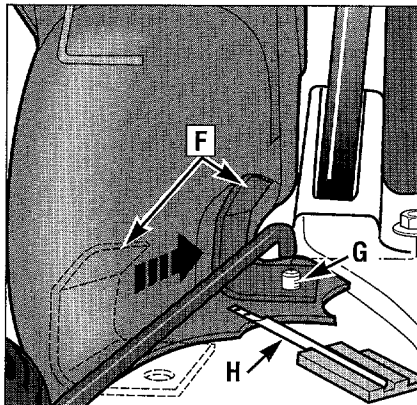


Figure 4-15: Install brace on boot.

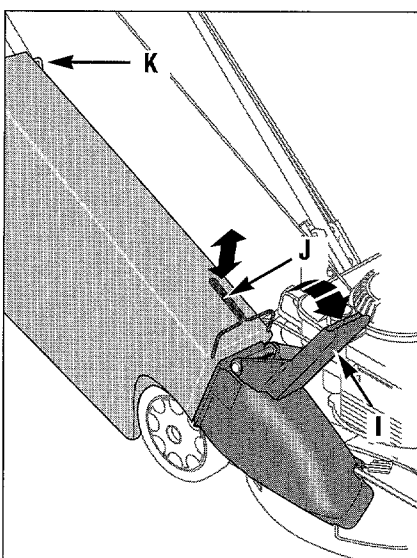


Figure 4-16: Installing Grass Catcher Bag.

G. Using handle (J, Figure 4-16), slide grass catcher bag collar between side grooves on boot opening.

H. Align hook (K, Figure 4-16) at other end of grass catcher bag over flat surface on right handlebar. *Do not place hook over any cables.*

I. Close zipper on bag before starting mower.

Emptying Grass Catcher Bag

A. Stop engine and wait for all moving parts to stop. Disconnect spark plug wire and move it away from spark plug.

B. Lift boot discharge lid (I, Figure 4-16) and, using handle (J, Figure 4-16) on top of bag inlet, slip bag off “boot” and handlebar for emptying. (If material is dry and bag is not full, bag can be emptied from front. If bag is full and/or material is wet, bag can be unzipped and emptied from rear.)

NOTE: Empty grass catcher bag after each use. Decomposing debris could generate enough heat to catch fire.

Removing Grass Catcher Bag and Boot Assembly

A. Stop engine and wait for all moving parts to stop. Disconnect spark plug wire and move it away from the spark plug.

B. Remove bag from grass catcher “boot” (C, Figure 4-14).

C. Remove “boot” by removing toplock nut (A, Figure 4-14). Also remove metal brace (F, Figure 4-15). Store metal brace with boot for future use.

D. Reinstall discharge cover (B, Figure 4-14) by placing cover over opening. Make sure that safety interlock rod on cover is securely in slot on mower deck. Reinstall toplock nut (A).

Section

5

Maintenance/Repairs

Read Me First!

Carefully read this Section on mower and engine maintenance and service.

Performing the required maintenance according to schedule will ensure the proper performance and long life of your machine.



CAUTION

Before inspecting, cleaning or servicing the machine, shut off engine, wait for all parts to stop moving, and disconnect spark plug wire. Remove ignition key on electric start models.

Failure to follow these instructions can result in personal injury or property damage.

NOTE: All references to left, right, front and rear of the machine are determined by standing behind the handlebars and facing the direction of forward travel.

Subjects covered in this Section include:

- Wheel Speed Adjustment – Single Speed Models
- Wheel Traction Adjustment – Variable Speed Models
- Wheel Drive Belt Replacement
- Blade Maintenance
- Blade Sharpening and Balancing
- Cleaning Under Deck and Under Mower Cover
- Operator Presence Controls Test
- Blade Brake Controls Test
- Battery Charging
- Battery Replacement
- Engine Maintenance
- Off-Season Storage
- Troubleshooting

REQUIRED MAINTENANCE SCHEDULE*			
REQUIRED MAINTENANCE	BEFORE EACH USE	EVERY 100 HOURS	AS NOTED
Check Bolts and Nuts	•		
Test Operator Presence Controls	•		
Test Blade Brake Controls	•		
Clean Underside of Mower	•		
Inspect Grass Catcher Bag (If Used)	•		
Check Engine Oil Level	•		1
Change Engine Oil			1
Inspect Air Filter			1
Inspect Spark Plug			1
Adjust Wheel Traction			2
Check/Replace Drive Belt			2
Blade Sharpening & Balancing			2

*Not all of the listed maintenance procedures are needed on all models. Check your Model Number to determine which procedures apply to your mower. Models are specified with the procedures.

¹ See Engine Owner's Manual.

² As Needed.

MOWER MAINTENANCE

NOTE: The maintenance procedures in this section can be applied to all models unless otherwise noted.



WARNING

Before performing any maintenance procedures, stop the engine, wait for all moving parts to stop, and allow the engine to cool. Disconnect the spark plug wire and move it away from the spark plug. Remove the ignition key on electric start models.

Failure to do this will result in personal injury or property damage.

WHEEL SPEED ADJUSTMENT

(Single Speed Models: 34021, 34021C, 34321 and 34321C)

The forward speed for this model was set at approximately 2-1/2 mph at the factory. See the factory setting shown in Figure 5-1. A slower or faster speed can be set by following these instructions:

A. Stop the engine and wait for all moving parts to stop. Disconnect the spark plug wire and move it away from the spark plug. Remove the ignition key on electric start models.

B. Put the Wheel Drive Lever in the **DISENGAGE** position.

C. Remove the front cover from the mower by removing the two phillips head screws which secure the cover. Pull the cover upward and then forward.

D. Temporarily install one of the deck cover Phillips screws into the spring retaining bracket (see **H**, Figure 5-6 on page 32).

E. For a reference point, push the pulley (**E**) toward the rabbit symbol and note the location of the adjustment rod spring (**D**) in relation to the turtle and rabbit. The spring should be positioned similarly to the one shown in Figure 5-1.

F. To increase the wheel speed, loosen the outer locknut (**B**, Figure 5-2), while pushing both the pulley (**E**) and adjustment rod spring (**D**) toward the rabbit symbol. Hold the spring and pulley in the new position.

G. Keep the wire (**C**) in the cable taut and re-tighten the two locknuts (**A** and **B**). See Figure 5-2.

H. To decrease the wheel speed, loosen the inner locknut (**A**, Figure 5-3), while pushing both the pulley (**E**) and adjustment rod spring (**D**) toward the turtle symbol. Hold the spring and pulley in the new position.

I. Keep the cable (**C**) taut and re-tighten the two locknuts (**A** and **B**).

J. Remove the Phillips screw from the spring retaining bracket and reinstall the front cover using the two Phillips screws. **DO NOT START ENGINE WITHOUT COVER SECURELY INSTALLED.**

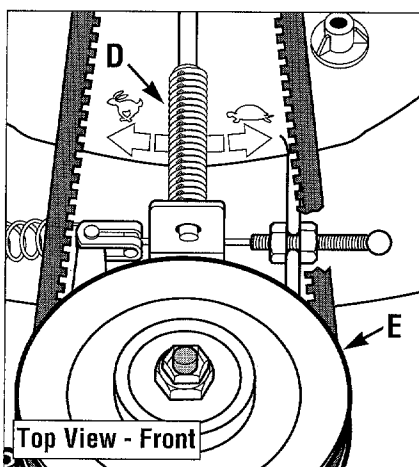


Figure 5-1: Factory setting of wheel speed.

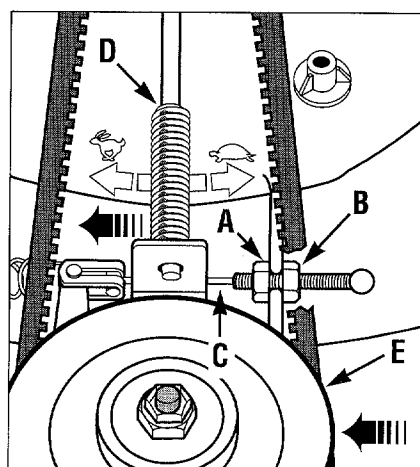


Figure 5-2: Manual wheel speed adjustment to **FASTER** speed.

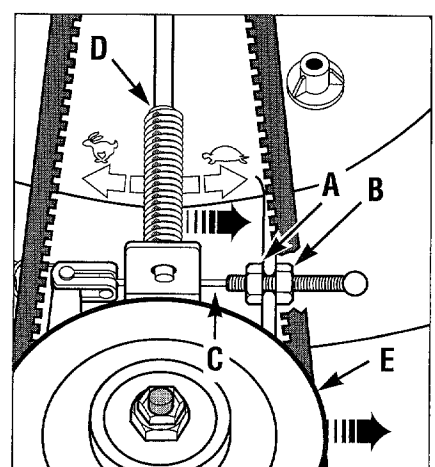


Figure 5-3: Manual wheel speed adjustment to **SLOWER** speed.

WHEEL TRACTION ADJUSTMENT (All models except Push Model)



WARNING

- Before performing any maintenance procedures, stop engine, wait for all moving parts to stop, and allow engine to cool. Disconnect spark plug wire and move it away from spark plug. Remove ignition key on electric start models.

- The wheel drive control on the mower must function properly or serious personal injury and property damage can result. Do not operate the mower if the wheel drive control does not properly engage and disengage the wheels.

Inspection

If the mower does not self-propel when the wheel drive control is engaged, first check for the following two conditions:

1. Loss of wheel drive can occur if moisture collects on the underside of the mower or under the front cover (especially after washing the mower). Let the mower dry thoroughly and then start the engine. Raise the front wheels slightly off the ground, engage the wheels, and let the wheels spin freely for about two minutes before lowering the wheels to the ground.
2. Inspect for grass or debris build-up under the front deck and under the front cover. Refer to "Cleaning Under Deck and Under Mower Cover" in this Section for the procedure to follow. Clean and dry these areas thoroughly, reinstall the cover, and test for proper wheel drive. **NOTE:** While cover is removed, check that belt is not broken or excessively worn.

If performing the above checks does not correct the problem, perform the "Initial Wheel Traction Adjustment" described next.

Initial Wheel Traction Adjustment

This procedure adjusts the tension on the wheel drive cable.

A. Stop the engine and wait for all moving parts to stop. Disconnect the spark plug wire and move it away from the spark plug. Remove the ignition key on electric start models.

B. Put the Wheel Drive Lever (or the Wheel Drive Control Bar on Models 34311, 34313 and 34328) in the DISENGAGE position.

C. Using two 1/2-inch wrenches, loosen the wheel drive cable adjustment nuts (**A** and **B**) that are shown in Figure 5-4 (all models except Models 34311, 34313 and 34328) or Figure 5-5 (Models 34311, 34313 and 34328).

D. Unthread the upper nut (**A**) until it reaches the uppermost threads on the threaded adjuster (do not remove nut).

E. Grasp the bottom end of the threaded adjuster and pull the cable assembly down a short distance. Thread the lower nut (**B**) upwards 2 to 3 (maximum) full turns and release the cable assembly.

F. Thread the upper nut (**A**) down against the cable bracket. Using two wrenches, tighten both nuts securely against the bracket.

G. With the engine stopped, move the mower outdoors. Make sure the area ahead of the mower is clear of any obstacles. Reconnect the spark plug wire, start the engine, and test for proper wheel drive:

- (1.) The wheels should turn when the Wheel Drive Lever (or Wheel Drive Control Bar) is engaged, but they should NOT turn if the lever (or control bar) is not engaged. On variable speed models, make sure the wheel drive functions correctly in all five speeds.

IMPORTANT: If the wheels turn when the Wheel Drive Lever (or Wheel Drive Control Bar) is NOT engaged, it is necessary to unthread the lower adjuster nut (**B**) until the condition is corrected. Follow steps A through F of the "Initial Wheel Traction Adjustment" instructions, but instead of threading the lower nut upward in step E, thread it downward. **DO NOT OPERATE THE MOWER UNTIL IT HAS BEEN PROPERLY ADJUSTED.**

- (2.) If the wheels do not turn when the Wheel Drive Lever (or Wheel Drive Control Bar) is engaged, repeat the "Initial Wheel Traction Adjustment" procedure one more time. If wheel drive is not obtained after a second attempt, perform the "Secondary Wheel Traction Adjustment" that follows.

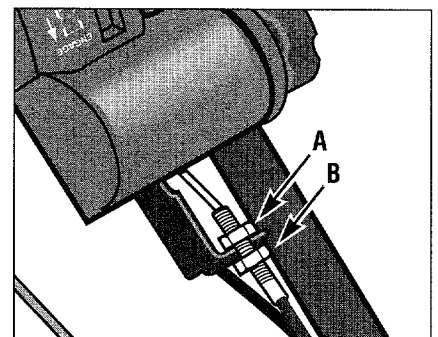


Figure 5-4: Cable adjustment nuts (on all variable speed models except Models 34311 and 34328).

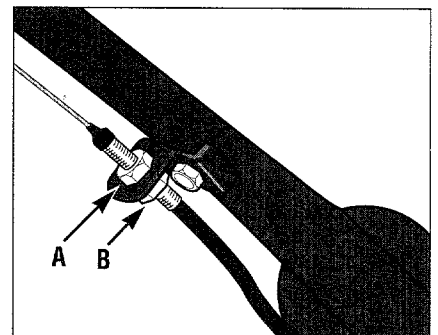


Figure 5-5: Cable adjustment nuts on Models 34311 and 34328.

Secondary Wheel Traction Adjustment

Perform this procedure if the "Initial Wheel Traction Adjustment" did not return wheel drive to your mower. This procedure should provide the proper gap adjustment between the friction drive disc and the wheel drive pulley. If this procedure does not result in satisfactory performance, please contact the factory or your local authorized mower dealer for further assistance.

A. Stop the engine and wait for all moving parts to stop.

Disconnect the spark plug wire and move it away from the spark plug. Remove the ignition key on electric start models.

B. Park the mower on a firm, level surface.

C. Put the Wheel Drive Lever (or the Wheel Drive Control Bar on Models 34311 and 34328) in the DISENGAGE position.

D. Using two 1/2-inch wrenches, loosen the wheel drive cable adjustment nuts (A and B) that are shown in Figure 5-4 or Figure 5-5.

E. Unthread the lower nut (B) a total of six full turns.

F. Thread the upper nut (A) down until the upper nut and the lower nut (B) touch the cable bracket.

G. Remove the front deck cover.

H. Temporarily install one of the front deck cover Phillips screws into the spring retaining bracket (H, Figure 5-6).

I. Gently pull the carrier arm (G, Figure 5-7) toward the front of the mower and release the arm.

J. Using two wrenches, tighten both cable adjustment nuts (Figure 5-4 or Figure 5-5) against the bracket.

K. On all models except the single speed models, put the Wheel Speed Adjustment Knob in speed setting No. 3.

L. Adjust the gap between the underside of the drive pulley (A, Figure 5-7) and the topmost edge of the rubber-rimmed drive disc (B) as follows:

NOTE: You will need a 1" x 4" strip of *thin* paper (notebook or stationery type) to properly adjust the gap.

- (1.) Remove the plastic thread protector (C, Figure 5-7).
- (2.) Hold the adjustment nut (D, Figure 5-7) with a 7/8" wrench and loosen the pal nut (E) 1 to 2 turns with a 3/4" wrench.

IMPORTANT: In the next step, do not overtighten the drive pulley against the rubber drive disc. It is only required that the drive pulley gently presses against the drive disc.

- (3.) Hold the sleeve nut (F) with a 7/8" wrench and slowly turn the adjustment nut (D) down (clockwise) 1/4 turn. From the right side (right side as viewed in Figure 5-7) try to insert the strip of paper between the drive pulley (A) and the topmost edge of the drive disc (B). If the paper will not fit (disc is touching pulley), go on to step 4.

If the paper fits between the pulley and disc, continue to slowly turn the adjustment nut downward (maximum 1/4 turn at a time) until the paper will not fit. Do not overtighten the pulley against the disc.

- (4.) As shown in Figure 5-8, use chalk or a pencil to put a starting mark on the top of the pulley, directly opposite one of the six "flats" (sides) on the adjustment nut. Then, hold the sleeve nut (F, Figure 5-7) with a 7/8" wrench and

turn the adjustment nut upward (counterclockwise) a total of two "flats" from this starting point. This should result in a visible gap (0.015"), between the drive pulley and the friction disc. Check that you can see this gap between the pulley and the disc.

- (5.) Using wrenches, prevent the adjustment nut (D) from turning and securely tighten the pal nut (E) in a clockwise direction.
- (6.) Return to the cable adjustment nuts (Figures 5-4 or 5-5) and unthread the upper nut (A) 2 to 3 full turns. Tighten the upper and lower nuts securely against the cable bracket.
- (7.) Put the Wheel Drive Lever (or Wheel Drive Control Bar) in the DISENGAGE position, lift the front of the mower, and try to rotate the front wheels by hand. They should turn. If the wheels do not turn, thread the upper and lower adjustment nuts (Figures 5-4 or 5-5) downward 2 to 3 full turns. Repeat this step as needed until the wheels turn.

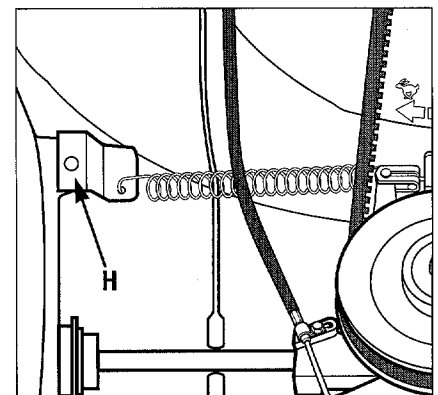


Figure 5-6: Use cover screw to temporarily hold spring retaining bracket in place.

- (8.) Put the Wheel Drive Lever (or Control Bar) in the ENGAGE position and try to turn the wheels. They should not turn. If they do, thread the upper and lower adjustment nuts (Figures 5-4 or 5-5) upward 2 to 3 full turns. Repeat this step as needed until the wheels do not turn.
- (9.) Reinstall the plastic thread protector (C).

M. Remove the Phillips screw from the spring retaining bracket and reinstall the front deck cover using the two Phillips head screws. **DO NOT START ENGINE WITHOUT COVER SECURELY INSTALLED.**

N. With the engine stopped, move the mower outdoors and make sure the area ahead of the mower is clear of any obstacles. Reconnect the spark plug wire, start the engine, and test for proper wheel drive:

- (1.) The wheels should turn when the Wheel Drive Lever (or Wheel Drive Control Bar) is engaged, but they should NOT turn if the lever (or control bar) is not engaged. On variable speed models, make sure the wheel drive functions properly in all five speed settings.

IMPORTANT: If the wheels turn when the Wheel Drive Lever (or Wheel Drive Control Bar) is NOT engaged, readjust the mower by repeating steps A through M. DO NOT OPERATE THE MOWER UNTIL IT HAS BEEN PROPERLY ADJUSTED.

- (2.) If the wheels do not turn when the Wheel Drive Lever (or Wheel Drive Control Bar) is engaged, repeat steps A through M.

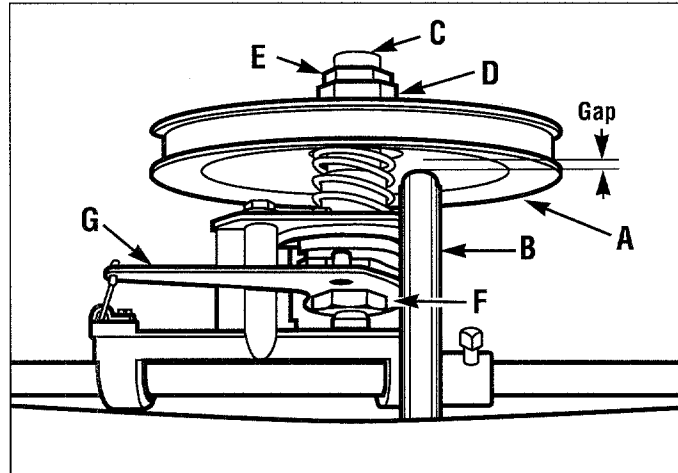


Figure 5-7: Pulley drive adjustment.

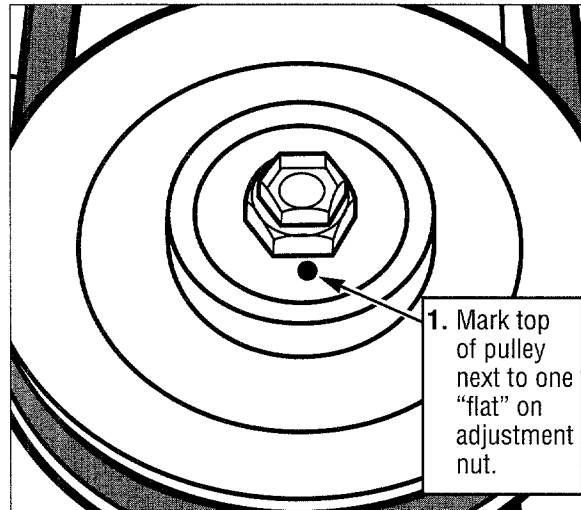


Figure 5-8: Adjustment nut has six "flats" (sides).

WHEEL DRIVE BELT REPLACEMENT (All Models Except Models 34311, 34313 and 34328)



WARNING

Before performing any maintenance procedures, stop the engine, wait for all moving parts to stop, and allow the engine to cool. Disconnect the spark plug wire and move it away from the spark plug. Remove the ignition key on electric start models.

A loss of traction may be caused by a broken or worn belt. To install a new belt, follow the instructions below.

NOTE: The drive belt is self-tensioning and does not require tension checks or adjustments.

To Remove Belt:

A. Stop engine and wait for all moving parts to stop. Disconnect spark plug wire and move it away from spark plug. Remove ignition key on electric start models.

B. Remove the front deck cover by removing the two Phillips head screws which secure the cover. Then pull the cover upward and forward.

C. Temporarily install one of the cover screws into the spring retaining bracket (**H**, Figure 5-6).

D. Remove tension on the drive belt by pressing down (hard) on the rear of the drive pulley (**A**, Figure 5-9). Slip the belt off the pulley.

IMPORTANT: If tipping the mower during a maintenance procedure, tip the mower rearward rather than forward or to either side.



CAUTION

When working near the blade, wear heavy leather gloves to protect yourself from the sharp edges on the blade.

E. Tip the mower rearward so that you can access the mower blade area. Prop the mower securely in place. Put on heavy leather gloves to protect yourself from the sharp mower blade.

F. Remove the mower blade and coupling as a complete assembly by removing the center shoulder bolt (do not remove the two blade mounting bolts). Refer to "Blade Maintenance - All Models Except Models 34311, 34313 and 34328" on page 38 for detailed blade and coupling removal instructions.

G. On models so equipped, remove the grass shield (**B**, Figure 5-10) by removing the three self-threading screws (use a 3/8" wrench) that secure the shield.

H. Slip the drive belt off the engine crankshaft pulley (**H**, Figure 5-9) and remove the belt.

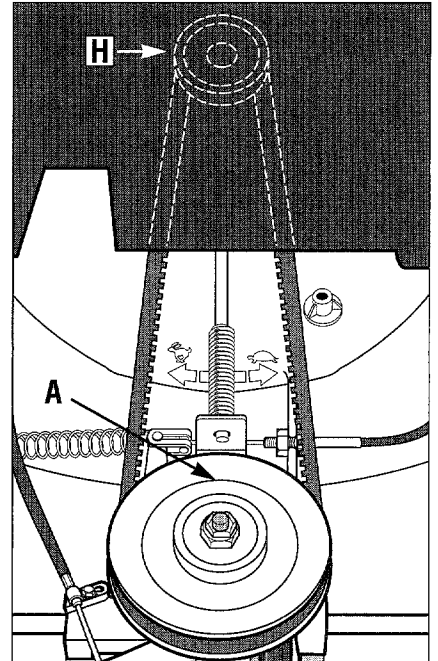


Figure 5-9: Press down on rear of pulley (A) to install or remove belt.

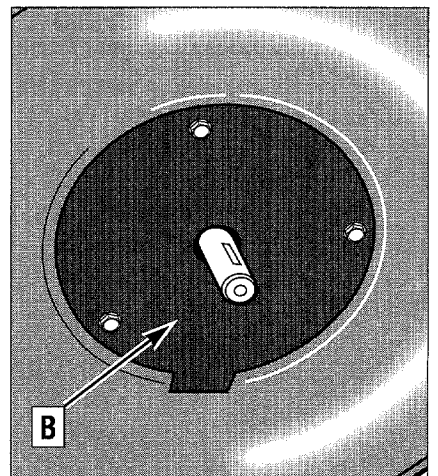


Figure 5-10: Remove grass shield (on models so equipped).

To Install Belt:

A. From the underside of the deck, install one end of the belt in the groove of the engine crankshaft pulley (**H**, Figure 5-9). Push the other end of the belt through the deck opening at the front of the engine and pull it toward the drive pulley (**A**, Figure 5-9).

B. Lower the front of the mower to the ground.

C. Press down (hard) on the rear of the drive pulley (**A**, Figure 5-9) and slip the belt over the front of the pulley. Rotate the pulley in a clockwise direction to help seat the belt in the pulley groove.

D. Look down through the deck opening at the front of the engine and make sure the belt is still seated in the groove of the engine crankshaft pulley (**H**).

E. Raise the front of the mower and secure it in place.

F. Reinstall the grass shield (if so equipped) and tighten the three mounting screws securely (see Figure 5-10).

G. Reinstall the mower blade and coupling assembly by following the blade installation instructions on page 38.

H. Lower the front of the mower to the ground.

I. Remove the Phillips screw from the spring retaining bracket and reinstall the front deck cover using the two Phillips head screws.

DO NOT START ENGINE WITHOUT COVER SECURELY INSTALLED.

WHEEL DRIVE BELT REPLACEMENT (Models 34311, 34313 and 34328 only)



WARNING

Before performing any maintenance procedures, stop the engine, wait for all moving parts to stop, and allow the engine to cool. Disconnect the spark plug wire and move it away from the spark plug. Remove the ignition key on electric start models.

A loss of traction may be caused by a broken or worn belt. To install a new belt, follow the removal and installation instructions presented below.

NOTE: The drive belt is self-tensioning and does not require tension checks or adjustments.

To Remove Belt:

A. Stop the engine and wait for all moving parts to stop. Disconnect the spark plug wire and move it away from the spark plug. Remove the ignition key on electric start models.

B. Using a Phillips head screwdriver, remove the two screws which secure the front cover. Remove the cover by pulling the cover upward and forward.

C. Temporarily install one of the cover screws into the spring retaining bracket (**H**, Figure 5-6).

D. Cut a worn or damaged belt to remove.

NOTE: If removing a belt which will later be reinstalled, reverse the steps given for belt installation.

IMPORTANT: If tipping the mower during a maintenance procedure, tip the mower rearward rather than forward or to either side.



CAUTION

When working near the blade, wear heavy leather gloves to protect yourself from the sharp edges on the blade.

To Install Belt:

A. Using needle nose pliers, remove the spring (A, Figure 5-11) from the Blade Brake Control mechanism.

B. Remove the other Blade Brake Control spring (B) and cable.

C. Remove tension on the drive belt by pressing down (hard) on the rear of the drive pulley (C, Figure 5-12). Slip the belt off the pulley.

D. Tip the mower rearward until it rests on the edge of the rear deck. Secure the mower in place.

NOTE: On some units, a metal grass shield is installed between the mower blade and the opening in the housing. If so, it will be necessary to remove the grass shield (and the mower blade) before proceeding to step E.

E. Remove the hex head bolt (D) shown in Figure 5-13.

F. Rotate the Blade Brake Control arm (E, Figure 5-13) toward the handlebars. Note the holes (F) for the spring and cable.

G. Rotate the mower blade until one tip of the blade is toward the front of the mower.

H. Carefully slip the belt around that tip of the blade. Be careful not to nick the belt while doing this.

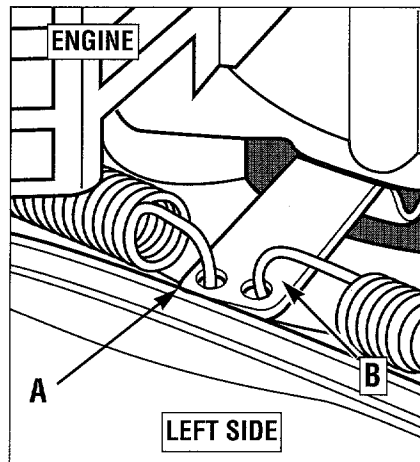


Figure 5-11: Remove Blade Brake Control spring and cable.

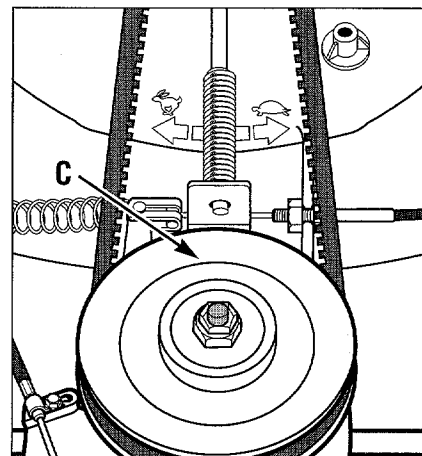


Figure 5-12: Press down rear of pulley to remove drive belt.

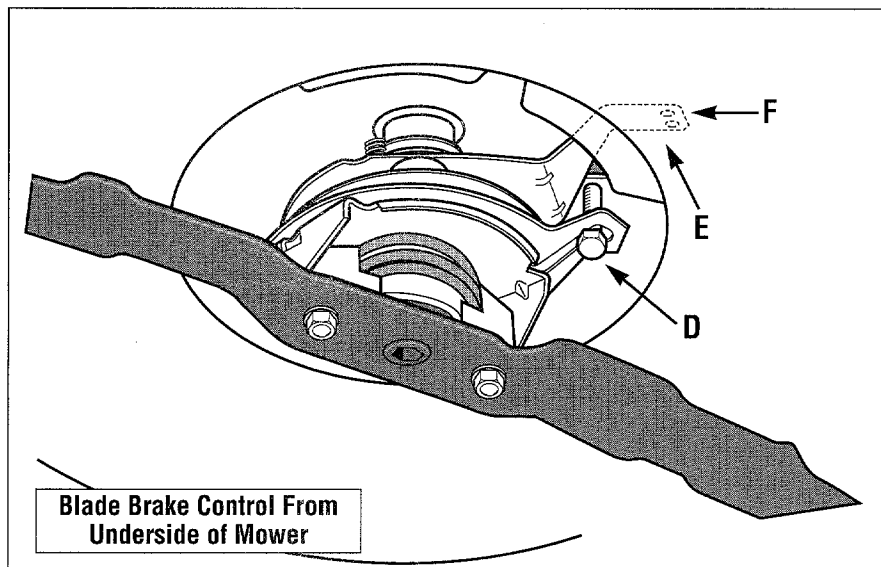


Figure 5-13: Blade Brake Control shoulder bolt and arm.

I. Rotate the blade until the other tip is at the front of the mower and slip the belt over that tip.

J. Place the belt around the Blade Brake Control plate (**G**, Figure 5-15) and up through the deck opening at the front of the engine. Slide the belt around the Blade Brake Control arm (**F**).

K. Maneuver the belt onto the engine crankshaft pulley (**H**, Figure 5-14).

L. Tilt the rear of the wheel drive pulley (**C**, Figure 5-12) toward the engine and install the belt on the pulley.

M. Rotate the Blade Brake Control plate (**G**, Figure 5-14) back into position to allow insertion of shoulder bolt (**D**, Figure 5-13). Securely tighten the shoulder bolt.

NOTE: If a grass shield was removed in the previous steps, reinstall it now (along with the mower blade, if the blade was also removed).

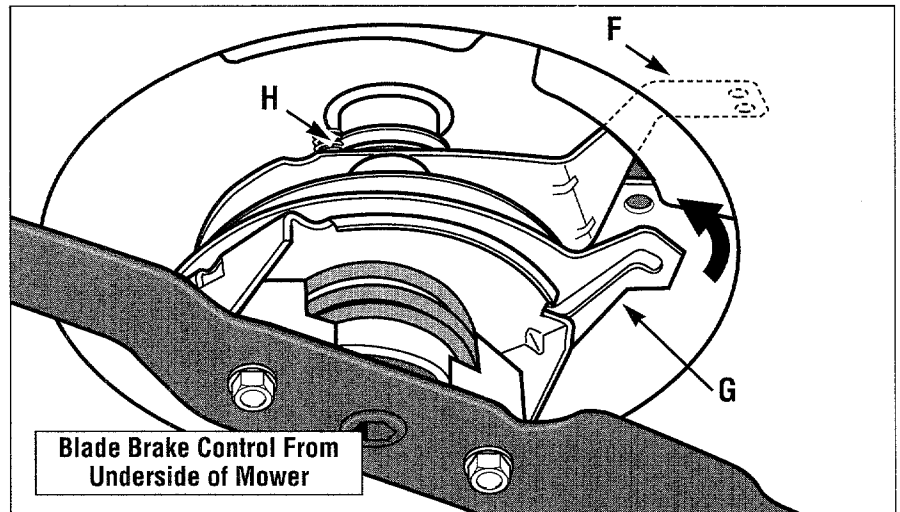


Figure 5-14: Rotate Blade Brake Control arm and plate for belt installation.

N. Replace the Blade Brake Control cable spring (**B**, Figure 5-15).

O. Using needle nose pliers, replace the Blade Brake Control spring (**A**, Figure 5-15) onto the the Blade Brake Control arm.

P. Remove the Phillips screw from the spring retaining bracket and reinstall the front deck cover using the two Phillips head screws. **DO NOT START ENGINE WITHOUT COVER SECURELY INSTALLED.**

Q. Perform the Blade Brake Control Test on Page 40.

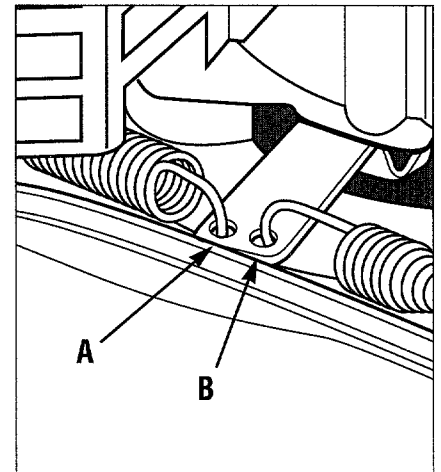


Figure 5-15: Install Blade Brake Control cable and spring.

BLADE MAINTENANCE (All Models Except Models 34311, 34313 and 34328)



WARNING

- Before performing any maintenance procedures, stop the engine, wait for all moving parts to stop, and allow the engine to cool. Disconnect the spark plug wire and move it away from the spark plug. Remove the ignition key on Electric Start Models.

- When working near the blade, wear heavy leather gloves to protect yourself from the sharp edges on the blade.

IMPORTANT: If tipping mower during a maintenance procedure, tip mower rearward rather than forward or to either side.

To Remove Blade:

A. Remove the two hex head cap-screws (A, Figure 5-16), and locknuts (B).

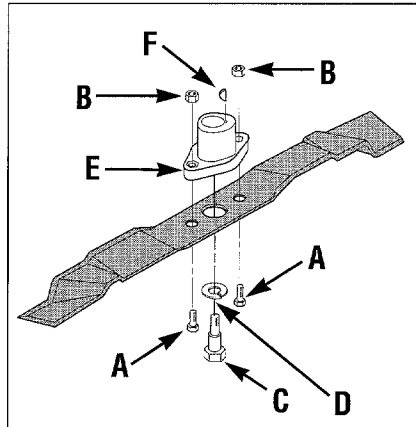


Figure 5-16: Remove/Install blade (except Models 34311 & 34328).

B. Remove the center shoulder bolt (C) and lockwasher (D).

IMPORTANT: If blade coupling (E) is removed from engine crankshaft, be sure to reinstall key (F) in crankshaft. Also, apply a coating of removable thread-locking compound (such as LOCTITE® 242) to the crankshaft before reinstalling blade coupling.

To Install Blade:

A. Place blade on coupling (E) on lower end of engine crankshaft. Make sure blade is positioned with bent ends of blade pointing downward.

NOTE: An identification number is also located on *top* side of blade.

B. Insert hex head capscrews (A, Figure 5-16) through small holes in blade. Loosely install toplock nuts (B).

C. Place lockwasher (D) on shoulder bolt (C). Apply a coating of removable thread-locking compound (such as LOCTITE® 242) to threads of bolt. Loosely install bolt in center hole as shown in Figure 5-16.

D. Alternately tighten the two capscrews (A) to a torque value of 20-25 ft-lbs.

E. Tighten shoulder bolt (C) to a torque value of 25-30 ft-lbs.

BLADE MAINTENANCE (Models 34311, 34313 and 34328)



WARNING

- Before performing any maintenance procedures, stop the engine, wait for all moving parts to stop, and allow the engine to cool. Disconnect the spark plug wire and move it away from the spark plug. Remove the ignition key on Electric Start Models.

- When working near the blade, wear heavy leather gloves to protect yourself from the sharp edges on the blade.

IMPORTANT: If tipping the mower during a maintenance procedure, tip mower rearward rather than forward or to either side.

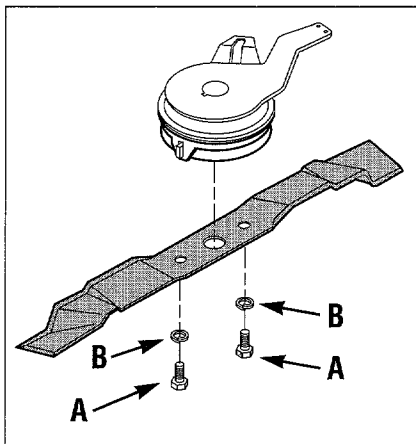


Figure 5-17: Remove/Install blade (Models 34311 and 34328).

To Remove Blade:

A. Using a 17 mm metric wrench, remove the two hex head screws (A) and lockwashers (B) from the blade. See Figure 5-17.

To Install Blade:

A. Align the holes in the blade with the holes in the BBC mechanism. Make sure that the bent ends of the blade point downward.

NOTE: An identification number is also located on *top* side of blade.

B. Insert the two metric hex head capscrews and lockwashers and tighten securely to a torque value of 20-25 ft-lbs. **Do not use LOCTITE®.**

BLADE SHARPENING AND BALANCING (All Models)

IMPORTANT : Professional sharpening services or your local dealer are equipped to sharpen mower blades safely. We recommend that the blade be professionally sharpened. Replace a cracked or severely worn blade with a new one.

A. Remove blade from mower as described in "Blade Maintenance." Check for blade wear or damage.

B. Clamp the blade in a vise. Use a metal file or grinder to sharpen the blade while maintaining original cutting angles.

C. To retain blade balance, remove the same amount of material from both ends of the blade.

D. To make sure that the blade is properly balanced, place blade on a rounded pencil or pen (or other pivot) under center hole. Hold blade parallel to ground. See Figure 5-18. If blade is unbalanced, the heavier side will lean downward.

E. With a file, carefully remove material from heavier side of blade.

F. Re-install blade by following the instructions in "Blade Maintenance."

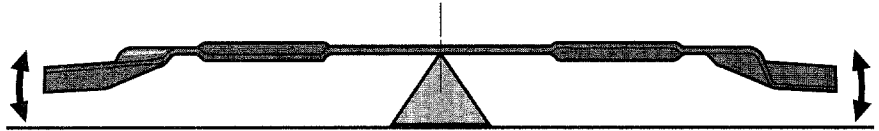


Figure 5-18: Balance blade (all models).

CLEANING UNDER DECK AND UNDER MOWER COVER (All Models)

Correct procedures should be followed when clearing grass build-up to ensure proper functioning of the wheel drive system on self-propelled models.



WARNING

- Before performing any maintenance procedures, stop the engine, wait for all moving parts to stop, and allow the engine to cool. Disconnect the spark plug wire and move it away from the spark plug. Remove ignition key on electric start models.

- When working near the blade, wear heavy leather gloves to protect yourself from the sharp edges on the blade.

NOTE:

- If tipping mower during a maintenance procedure, tip mower rearward rather than forward or to either side.

- Loss or slipping of wheel drive can occur after washing underside or under cover of mower. Let parts dry thoroughly after using water spray to clear grass build-up.

Cleaning Underside of Mower Deck:

A. Check the mower regularly for grass build-up.

B. Cleaning under mower deck should be done after (rather than before) operating the mower.

C. Scrape off excess grass. If using a hose to remove grass build-up, let the mower dry thoroughly before operation.

IMPORTANT: Loss or slipping of the mower's wheel drive can occur if the rubber friction disk is wet.

Cleaning Under Mower Cover:

A. Check underside of mower cover for grass build-up *at the beginning and in the middle of each mowing season.*

B. Remove the front cover of the mower by removing the two phillips head screws which secure the cover. Pull the cover up and then forward.

C. Temporarily install one of the cover screws into the spring retaining bracket (**H**, Figure 5-6).

D. Scrape out any grass build-up. (If water is used to clean this area of the mower, the mower should be allowed to dry thoroughly before operation.)

IMPORTANT: Loss or slipping of the mower's wheel drive can occur if the rubber friction disk is wet.

E. Check that the three (3) drain holes in the mower deck are unclogged.

F. Remove the Phillips screw from the spring retaining bracket and reinstall the front deck cover using the two screws.

OPERATOR PRESENCE CONTROLS TEST (All Models Except Models 34311, 34313 and 34328)

Perform the following test before each use of the mower:

A. With the engine running at **FAST** speed, release Operator Presence Control Bar. If engine stops within 3 seconds, the blade stops and the system is operating correctly.

B. If engine runs longer than 3 seconds after release of the Operator Control Bar, the controls are not working properly.

Immediately stop the engine by moving the Engine Speed Lever to the CHOKE position, disconnect the spark plug wire, and move the wire away from the spark plug.

C. Do not use the mower until the Operator Presence Control System has been inspected, adjusted, or repaired by an authorized service dealer.



WARNING

To avoid personal injury or property damage, make sure that the mower is on grass, and that the test area is clear of foreign objects and bystanders before you begin the Operator Presence Controls Test.

If the Operator Presence Control System is damaged or not adjusted correctly, the blade may continue to rotate after release of the operator Presence Control Bar. If the blade does not stop within three seconds of release of the bar, move the Engine Speed Lever to the CHOKE position to stop the engine. To avoid personal injury do not operate the mower until the Operator Presence Control System has been repaired.

Failure to do this could result in personal injury or property damage.

BLADE BRAKE CONTROLS TEST (Models 34311, 34313 and 34328 only)

When the Blade Brake Control Bar is released during operation of the mower, the wheels and engine do not stop, but the blade should stop within 3 seconds. The following provides a visual test of whether the Blade Brake Control is functioning. Perform this test before each use of the mower:

A. Park the mower on a portion of the lawn which has not been recently mowed.

B. Set the cutting height so that the mower cuts 1/3 of the grass.

C. Disengage the Wheel Drive Control Bar.

D. Start the engine and put the Engine Speed Lever in **FAST**.

E. ENGAGE the Blade Brake Control by grasping the Blade Brake Control Bar up against the handlebar and moving the Blade Brake Control Lever forward until it latches into place. Manually push the mower forward for several feet.



WARNING

To avoid personal injury or property damage, make sure that the mower is on grass, and that the test area is clear of foreign objects and bystanders before you begin the Blade Brake Control Test (Model 34024).

If the Blade Brake Control Bar is damaged or not adjusted correctly, the blade may continue to rotate after release of the Blade Brake Control Bar. If the blade does not stop within three seconds of release of the bar, move the Engine Speed Lever to the STOP position. To avoid personal injury do not operate the mower until the Blade Brake Control System has been repaired.

Failure to do this could result in personal injury or property damage.

F. Release the Blade Brake Control. Look at the lawn just mowed. The lawn should be cut up to the point where the Blade Brake Control was released. This indicates that the Blade Brake Control is engaging the blade.

G. With the Wheel Drive Control Bar in **DISENGAGE** and the Blade Brake Control **DISENGAGED**, push the mower forward for several more feet. Look at the lawn.

The grass should *not* have been cut. This indicates that the Blade Brake Control has disengaged the blade.

H. If the mower cuts the grass in Step G, the Blade Brake Control is not disengaging the blade. **Immediately stop the engine, disconnect the spark plug wire, and move the wire away from the spark plug.**

I. Do not use the mower until the Blade Brake Control System has been inspected, adjusted, or repaired by an authorized dealer.

BATTERY CHARGING

(Models 34023, 34323 and 34323C - Variable Speed With Electric Start)

The battery is located under the mower deck. The battery does not have to be removed from the mower for battery charging.

A. *Stop the engine, disconnect the spark plug wire and move it away from the spark plug. Make sure all moving parts have come to a complete stop. Remove the key from the keyswitch.*

B. Plug the battery charger (A) into a *grounded 120V wall outlet*. (Note that the battery charger is designed for use indoors and should not be exposed to rain or snow.) Attach the connector from the charger (B) to the connector at the handlebars (C) as shown in Figure 5-19. Allow the battery to charge for 24 hours before using the ignition switch to start the engine.

C. Unplug the battery charger (A) from the wall outlet and then unplug the wire harness connectors (B and C).

D. You will also need to seasonally charge the battery by following Steps A through C.



WARNING

- When charging the battery after operating the mower, stop the engine, wait for all moving parts to come to a complete stop, disconnect the spark plug wire and move it away from the spark plug. Remove the key from the keyswitch.
 - If tipping the mower during a maintenance procedure, tip the mower rearward rather than forward or to either side.
 - Do not use any battery charger other than the one which was supplied with the mower. Use of any other battery charger could permanently damage the battery.
 - Do not short circuit the battery wires by touching the connectors together, or touching metal objects with the connectors. Remove all metal jewelry when working near the electrical system.
 - Do not smoke, use any flame, or generate sparks near the battery during battery charging.
 - Do not charge the battery for more than 24 hours.
- Failure to follow these instructions could result in serious personal injury or property damage.

Seasonal Battery Charging

The mower's engine alternator continuously charges the battery while the mower is in operation. However, to ensure that the mower is always ready for use, the battery should be additionally charged for 24 hours at the start and end of the mowing season.

Battery Removal/Installation

Removal:

A. *Stop the engine, disconnect the spark plug wire and move it away from the spark plug. Make sure all moving parts have come to a complete stop.*

B. Disconnect the wire harness at the connector leading from the battery and engine.

C. Remove the two screws which secure the battery bracket.

D. Remove the battery bracket and battery.

Installation:

A. Position the battery on the bracket with the wire terminals toward the left rear side of the mower. Reinstall the bracket using the hardware removed above in Step C.

B. Reconnect the wire harness at the connection leading from the battery and engine.

C. Initially charge the battery for 24 hours following the instructions provided under "Battery Charging."

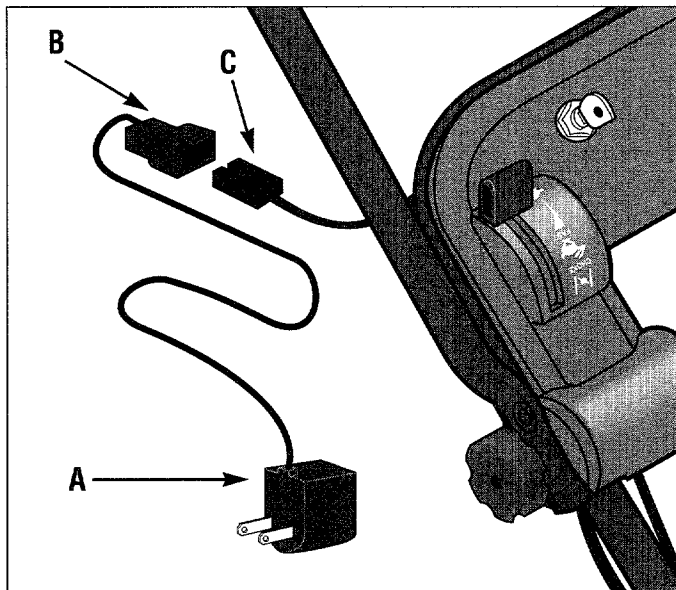


Figure 5-19: Battery charging.

ENGINE MAINTENANCE



CAUTION

Before performing any engine maintenance, stop the engine, wait for all moving parts to come to a complete stop, disconnect the spark plug wire and move it away from the spark plug. Remove the ignition key on electric start models.

Failure to follow these instructions will result in serious personal injury or property damage.

Follow the instructions in the Engine Owner's Manual to perform these procedures, depending on your Engine Model:

- Check Engine Oil Level
- Add Oil to Engine
- Change Engine Oil
- Inspect the Air Cleaner
- Inspect Spark Arrestor
- Inspect Spark Plug

COMPACT STORAGE

Fold the handlebars for compact storage of the mower: See Figure 5-20.

A. Remove the locking square bail pins from the handlebar mounting channels on each side of the unit.

B. Fold the entire handlebar assembly forward and downward.

NOTE: Do not pinch cable(s) while folding handlebars.

C. Loosen the upper handlebar adjustment knobs and fold the upper section of the handlebars downward toward the rear of the mower. (This is the position in which the mower was shipped and allows for very compact mower storage.)

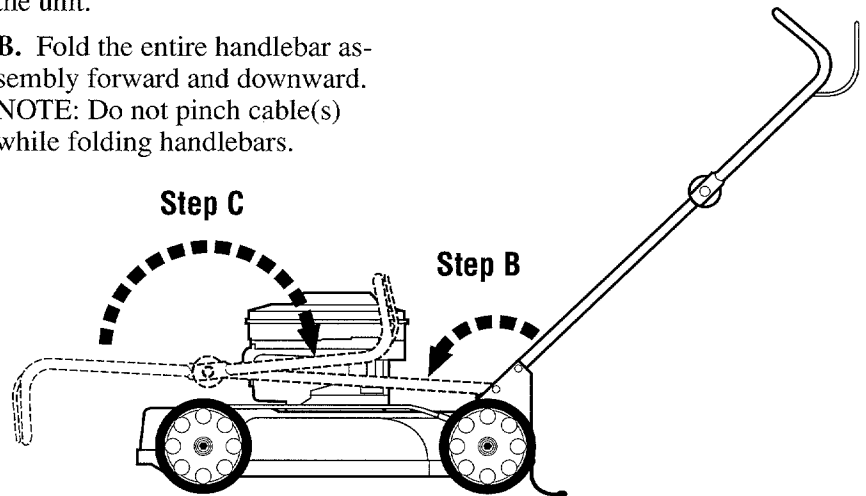


Figure 5-20: Fold handlebars for compact storage.

OFF-SEASON STORAGE

When storing the mower for extended periods of time, follow these procedures to ensure that the mower will be in good condition for future use.

- Store mower in a level position.
- Thoroughly inspect the mower for any loose, broken, or missing parts. Repair or replace as necessary.
- Remove all fuel from fuel tank or use a fuel stabilizer additive as directed in Engine Owner's Manual.
- Change engine oil.
- Remove spark plug and squirt 1/2 ounce of engine oil into spark plug hole. Cover hole with a rag. Slowly pull recoil starter rope to crank engine and reinstall spark plug.
- Clean any dirt, grass or chaff from air cooling system intake area and other parts of engine.
- Lubricate cutting height adjustment handle by putting a few drops of motor oil on the adjustment screw (which can be accessed from under the deck). Turn adjustment knob through full range of settings.
- Check all nuts and bolts for tightness.
- On electric start models remove key from keyswitch. Charge the battery for 24 hours before and after seasonal storage.
- Disconnect spark plug wire from spark plug. Prevent wire from touching spark plug by placing wire boot on holding tab on the engine.



DANGER

- Never perform maintenance while engine is running or when spark plug wire is connected except where specifically instructed to do so.
- Never store mower with fuel in fuel tank inside a building where fumes can reach an open flame or spark, or where ignition sources are present such as hot water and space heaters, furnaces, clothes dryers, stoves, electric motors, etc. Make sure engine is cool before storing.
- Drain gasoline outdoors into an approved container.
- Do not smoke and keep away from open flame.

Failure to follow these instructions will result in serious personal injury or property damage.

TROUBLESHOOTING

Before performing any of the corrections in this Troubleshooting Chart, refer to the appropriate information contained in this Manual for the correct safety precautions and operating or maintenance procedures. Contact your local authorized Engine Service Dealer for engine service. Contact your local authorized Mulching Mower dealer or the Factory for service problems with the machine.

PROBLEM	POSSIBLE CAUSE	CORRECTION
Engine does not start.	<ol style="list-style-type: none"> 1. Spark plug wire disconnected. 2. Engine Speed Lever in incorrect position. 3. Fuel tank empty. 4. Stale gasoline. 5. Safety Interlock connector on grass catcher boot or discharge cover not securely in place. 6. Dirty air filter(s). 7. Defective or incorrectly gapped spark plug. 8. Carburetor out of adjustment. 9. Defective Engine Speed Lever or wiring. 10. Defective safety interlock switch or wire. 11. Dirt or water in fuel tank. 12. Operator Presence Control Bar not engaged. 	<ol style="list-style-type: none"> 1. Reconnect wire. 2. Put lever in CHOKE. 3. Add fuel. 4. Drain fuel and add fresh fuel. 5. Attach connector to interlock switch. 6. Clean or replace. 7. Inspect spark plug. 8. See Engine Service Dealer. 9. Inspect lever and wiring, replace entire assembly if damaged or defective. 10. Inspect assembly and wiring, replace if damaged or defective. 11. See Engine Service Dealer. 12. Pull Operator Presence Control Bar up against handlebar.
Engine runs poorly.	<ol style="list-style-type: none"> 1. Defective or incorrectly gapped spark plug. 2. Dirty air filter(s). 3. Carburetor out of adjustment. 4. Stale gasoline. 5. Dirt or water in fuel tank. 6. Engine cooling system clogged. 	<ol style="list-style-type: none"> 1. Inspect spark plug. 2. Clean or replace. 3. See Engine Service Dealer. 4. Drain gasoline and add fresh gasoline. 5. See Engine Service Dealer. 6. Clean air cooling area.
Engine overheats.	<ol style="list-style-type: none"> 1. Engine cooling system clogged. 2. Carburetor out of adjustment. 3. Oil level is low. 	<ol style="list-style-type: none"> 1. Clean air cooling areas. 2. See Engine Service Dealer. 3. Check and add oil.
Engine does not shut off.	<ol style="list-style-type: none"> 1. Defective Engine Speed Lever or wiring. 2. Defective Operator Presence Controls. 3. Defective Blade Brake Controls (Models 34311, 34313 and 34328) 	<ol style="list-style-type: none"> 1. Inspect and replace if necessary. 2. See local dealer for replacement. 3. See local dealer for replacement.
Poor mowing performance.	<ol style="list-style-type: none"> 1. Dull blade. 2. Cutting height is too low or high for height of grass being cut. 3. Underside of mower deck is clogged with wet grass clippings. 4. Engine not at FAST Speed. 5. If grass catcher is used, it may be full. 	<ol style="list-style-type: none"> 1. Sharpen or replace blade. 2. Adjust cutting height to cut approximately 1/3 of the length of the grass. Then gradually work down to desired cutting height. 3. Shut off engine, use a garden hose to clean underside of mower deck. 4. Move Engine Speed Lever to FAST speed. 5. Empty grass catcher bag.

Maintenance/Repairs

PROBLEM	POSSIBLE CAUSE	CORRECTION
Blade does not stop within 3 seconds of release of Operator Presence Control Bar (all models except 34311, 34313 and 34328).	1. System not working properly.	1. Contact local dealer or Factory.
Blade does not stop within 3 seconds of release of Blade Brake Control Bar Models 34311, 34313 and 34328)	1. System not working properly.	1. Contact local dealer or Factory.
Mower vibrates abnormally.	1. Blade mounting bolts loose. 2. Unbalanced Blade. 3. Loose nuts or bolts. 4. Bent crankshaft.	1. Tighten bolts. 2. Remove blade and rebalance. 3. Check all nuts and bolts, particularly engine mounting bolts. 4. Contact local dealer or the Factory.
Poor traction (Self-propelled Models).	1. Wheel drive components wet. 2. Grass build-up in drive component area. 3. Wheel drive cable or pulley/disc out of adjustment. 4. Rubber drive disc worn. 5. Wheel drive cable assembly damaged. 6. Worn or broken wheel drive belt.	1. See "Wheel Traction Adjustment" in Maintenance/Repairs section. Check that all drain holes in bottom of deck are open. 2. See "Cleaning Under Deck and Under Mower Cover" in Maintenance/Repairs section. 3. See "Wheel Traction Adjustment" in Maintenance/Repairs section. 4. Replace rubber disc. 5. Replace cable assembly. 6. Replace drive belt.
Front wheels do not stop when Wheel Drive Lever is In DISENGAGE position. (Self-propelled models except Models 34311, 34313 and 34328.)	1. Wheel drive cable needs adjustment. 2. Wheel drive cable assembly damaged.	1. See "Wheel Traction Adjustment" in Maintenance/Repairs section. 2. Replace entire cable assembly.
Electric starter does not start engine (electric start models).	1. Wire harness connector unconnected. 2. Battery not charged. 3. Broken wire in wiring harness. 4. Malfunctioning starter motor.	1. Reconnect wiring harness. 2. Charge battery. 3. Replace wiring harness. 4. Contact local engine dealer.
Battery does not charge during engine operation (electric start models).	1. Broken wiring in engine recharging circuit. 2. Malfunctioning engine recharging system. 3. Dead battery.	1. Contact local engine dealer. 2. Contact local engine dealer. 3. Replace battery.
Battery charger does not charge battery (electric start models).	1. Broken battery lead. 2. Broken battery charger wire or malfunctioning battery charger. 3. Dead battery.	1. Replace battery lead. 2. Replace battery charger. 3. Replace battery.

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LIMITED WARRANTY

Products Covered This warranty is for the following TROY-BILT® branded products and their attachments or accessories: chipper/shredders, chipper/vacs, walk-behind mowers, riding mowers, tractors, snow throwers, brush-cutters, sprayers, carts, composters and the Mini-Tiller.

Date Warranty Begins The warranty begins on the date of purchase.

What is Covered This product (except for the engine, as explained below) is warranted by Garden Way Incorporated to **the original purchaser only**, to be free of defects in material and workmanship under normal use and service for the following time periods:

NON-COMMERCIAL RESIDENTIAL USE 7 Years

COMMERCIAL OR OTHER NON-RESIDENTIAL USE 90 Days

ENGINES: Engines used for non-commercial residential purposes are covered by the engine manufacturer's separate Limited Warranty. Garden Way Incorporated does, however, extend the length of the engine manufacturer's limited warranty, providing you with coverage for a total of 3 years. Please refer to the separate engine owner's manual for details concerning the engine manufacturer's Limited Warranty.

Engines used for commercial or other non-residential purposes are warranted by their respective manufacturer for the time periods indicated in the Limited Warranty printed in the separate engine manufacturer's owner's manual.

What is Not Covered 1. This warranty does not cover the periodic, normal replacement of parts that wear out, such as belts, seals, blades, batteries, etc.

2. This warranty does not cover damage, malfunctions or failures due to:

a) Use of unauthorized accessories or attachments.

b) Misuse, accidents, or a lack of reasonable and necessary maintenance as specified in your product's Owner/Operator Manual (you may wish to keep records of maintenance and service).

What We Will Do For You We will, at our option, repair or replace any part found to be defective in material or workmanship, without charge for parts and labor. However, charges for pick-up, delivery, and service calls are not covered by this warranty.

How to Obtain Non-Engine Related Warranty Service

- You may be required to provide proof of the date of purchase (your sales receipt, for example).
- Contact any TROY-BILT® Authorized Service Dealer (if purchased from a dealer, we recommend that you contact the same dealer you purchased this product from in order to give the dealer the opportunity to service you to your satisfaction). Refer to your local telephone directory for the name of your nearest dealer or call the TROY-BILT® Technical Service Department (see toll-free number below) for assistance.

-OR-

- Contact the TROY-BILT® Technical Service Department in Troy, N.Y. at this toll-free number: **1-800-520-5520**.

How to Obtain Engine Warranty Service Contact any service dealer that is authorized by the manufacturer of your engine. Please refer to the engine manufacturer's Limited Warranty for exact details on how to obtain warranty service. If you have any questions or concerns regarding engine warranty service, please call the TROY-BILT® Technical Service Department for assistance.

Disclaimer of Consequential Damages Garden Way Incorporated shall not be liable under any circumstances for any incidental or consequential damages or expense of any kind, including but not limited to cost of equipment rental, loss of profits, or cost of hiring services to perform tasks normally performed by the equipment.

Limitation of Implied Warranties Any implied warranties, including without limitation any implied warranty of merchantability or fitness for a particular purpose, shall be limited in duration to a period of seven years (90 days if product is purchased for commercial or other non-residential use) from the date of sale.

SOME STATES DO NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, OR LIMITATIONS ON HOW LONG AN IMPLIED WARRANTY LASTS. THEREFORE, THE ABOVE LIMITATIONS OR EXCLUSIONS 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.

Garden Way Incorporated, 1 Garden Way, Troy, New York 12180