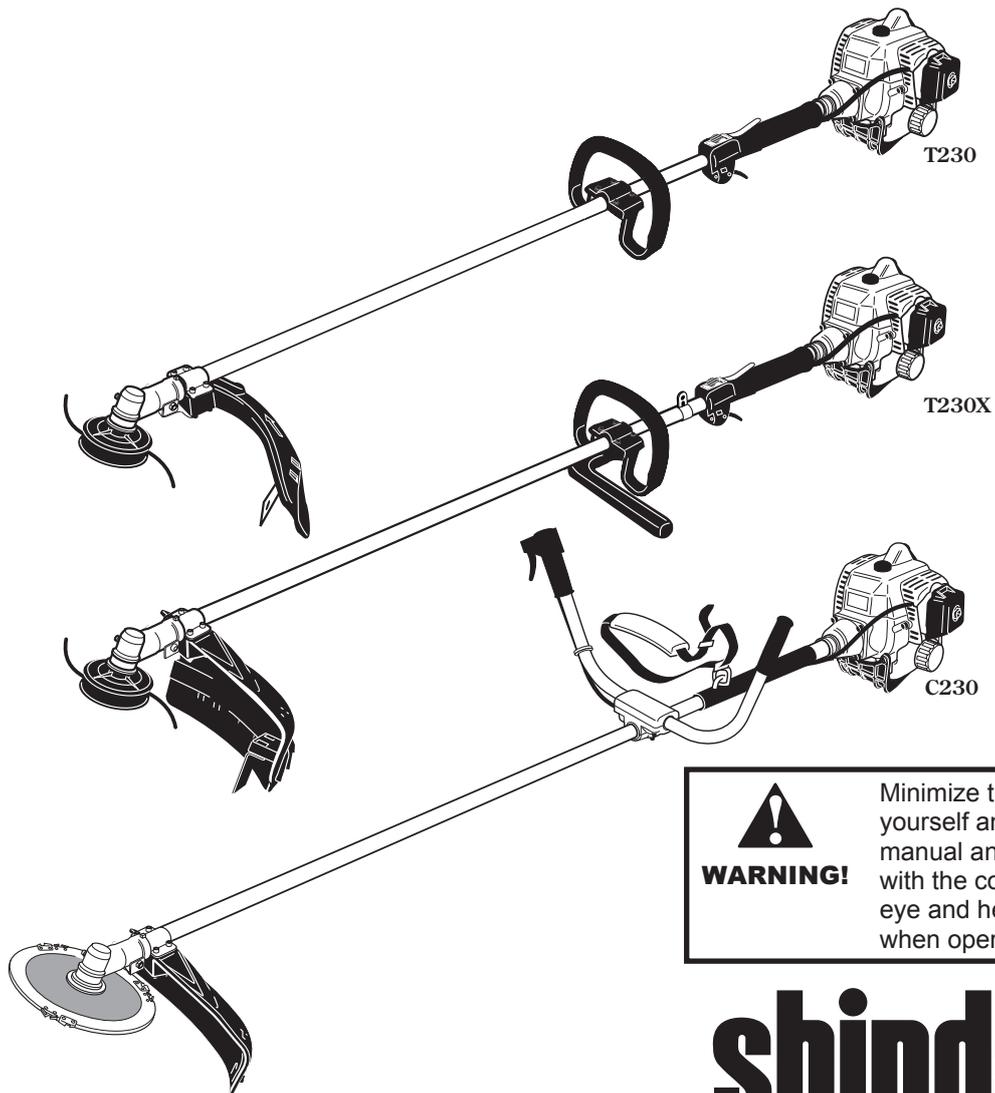


SHINDAIWA OWNER'S/OPERATOR'S MANUAL

T230 GRASS TRIMMER T230X GRASS TRIMMER C230 BRUSHCUTTER



WARNING!

Minimize the risk of injury to yourself and others! Read this manual and familiarize yourself with the contents. Always wear eye and hearing protection when operating this unit.

shindaiwa®

Part Number 62064-94013 Rev. 8/06

Introduction

Shindaiwa 230-series hand held power equipment has been designed and built to deliver superior performance and reliability without compromise to quality, comfort, safety or durability.

Shindaiwa's high-performance engines represent the leading edge of 2-cycle engine technology, delivering exceptionally high power with remarkably low displacement and weight. As an owner/operator, you'll soon discover for yourself why Shindaiwa is simply in a class by itself!

IMPORTANT!

The information contained in this owner's/operator's manual describes units available at the time of publication.

Shindaiwa Inc. reserves the right to make changes to products without prior notice, and without obligation to make alterations to units previously manufactured.

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Attention Statements

Throughout this manual are special "Attention Statements."



WARNING!

A statement preceded by the triangular attention symbol and the word "WARNING" contains information that should be acted upon to prevent serious bodily injury.

CAUTION!

A statement preceded by the word "CAUTION" contains information that should be acted upon to prevent mechanical damage.

IMPORTANT!

A statement preceded by the word "IMPORTANT" is one that possesses special significance.

NOTE:

A statement preceded by the word "NOTE" contains information that is handy to know and may make your job easier.



Read and follow this operators manual. Failure to do so could result in serious injury.



Wear eye and hearing protection at all times during the operation of this unit.



Keep bystanders at least 50 feet (15m) away during operation.



Beware of thrown or ricocheted objects.



Do not operate this unit with a blade unless the unit is equipped with a Shindaiwa-approved handlebar or barrier.



Always wear a harness when operating this unit with a blade. A harness is also recommended when using trimmer line.



If unit is used as a brushcutter, beware of blade thrust. A jammed blade can cause the unit to jerk suddenly and may cause the operator to lose control of the unit.

IMPORTANT!

The operational procedures described in this manual are intended to help you get the most from unit as well as to protect you and others from harm. These procedures are guidelines for safe operation under most conditions, and are not intended to replace any safety rules and/or laws that may be in force in your area. If you have questions regarding your Shindaiwa power tool, or if you do not understand something in this manual, your Shindaiwa dealer will be glad to assist you. You may also contact Shindaiwa, Inc. at the address printed on the back of this manual.

General Safety Instructions

Work Safely

Trimmers and brushcutters operate at very high speeds and can do serious damage or injury if they are misused or abused. *Never allow a person without training or instruction to operate this unit!*



WARNING!

Never make unauthorized attachment installations.



WARNING!

Use Good Judgment

NEVER run the engine when transporting the unit.

NEVER run the engine indoors! Make sure there is always good ventilation. Fumes from engine exhaust can cause serious injury or death.

ALWAYS use the proper cutting tool for the job.

ALWAYS stop the unit immediately if it suddenly begins to vibrate or shake. Inspect for broken, missing or improperly installed parts or attachments.

NEVER extend trimming line beyond the length specified for your unit.

ALWAYS keep the unit as clean as practical. Keep it free of loose vegetation, mud, etc.

ALWAYS hold the unit firmly with both hands when cutting or trimming, and maintain control at all times.

ALWAYS keep the handles clean.

ALWAYS disconnect the spark plug wire before performing any maintenance work.

ALWAYS, if a saw blade should bind fast in a cut, shut off the engine immediately. Push the branch or tree to ease the bind and free the blade.

General Safety Instructions The Properly Equipped Operator

Stay Alert

You must be physically and mentally fit to operate this unit safely.



WARNING!



Never operate power equipment of any kind if you are tired or if you are under the influence of alcohol, drugs, medication or any other substance that could affect your ability or judgement.



WARNING!

Minimize the Risk of Fire!

NEVER smoke or light fires near the unit.

ALWAYS stop the engine and allow it to cool before refueling. Avoid overfilling and wipe off any fuel that may have spilled.

ALWAYS inspect the unit for fuel leaks before each use. During each refill, check that no fuel leaks from around the fuel cap and/or fuel tank. If fuel leaks are evident, stop using the unit immediately. Fuel leaks must be repaired before using the unit.

ALWAYS move the unit to a place well away from a fuel storage area or other readily flammable materials before starting the engine.

NEVER place flammable material close to the engine muffler.

NEVER run the engine without the spark arrester screen in place.

Wear hearing protection devices and a broad-brimmed hat or helmet.

Wear close-fitting clothing to protect legs and arms. Gloves offer added protection and are strongly recommended. Do not wear clothing or jewelry that could get caught in machinery or underbrush. Secure long hair so that it is above shoulder level. NEVER wear shorts!

ALWAYS wear eye protection such as goggles or safety glasses to shield against thrown objects.

ALWAYS wear a harness when operating a unit equipped with a blade.

ALWAYS operate with both hands firmly gripping the unit.

When operating with a blade, make sure the handle is positioned to provide you with maximum protection from contacting the blade.

Keep a proper footing and do not overreach. Maintain your balance at all times during operation.

Keep away from the rotating trimmer line or blade at all times, and never lift a moving attachment above waist-high.

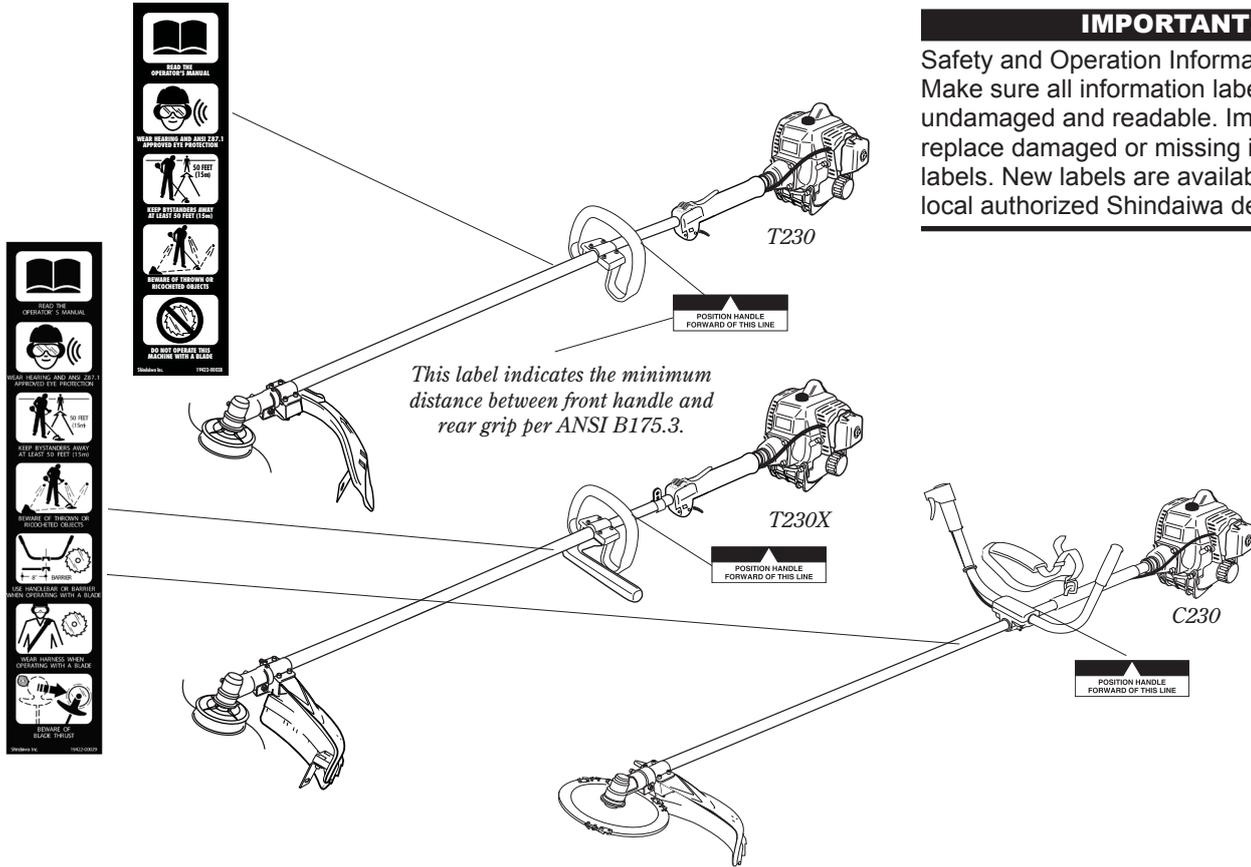
Wear appropriate footwear (non-skid boots or shoes): do not wear open-toed shoes or sandals. Never work bare-footed!

ALWAYS make sure the appropriate cutting attachment shield is correctly installed and in good condition.



Figure 1

Safety Labels



IMPORTANT!
 Safety and Operation Information Labels: Make sure all information labels are undamaged and readable. Immediately replace damaged or missing information labels. New labels are available from your local authorized Shindaiwa dealer.

Figure 2

Be Aware of the Working Environment (all units)

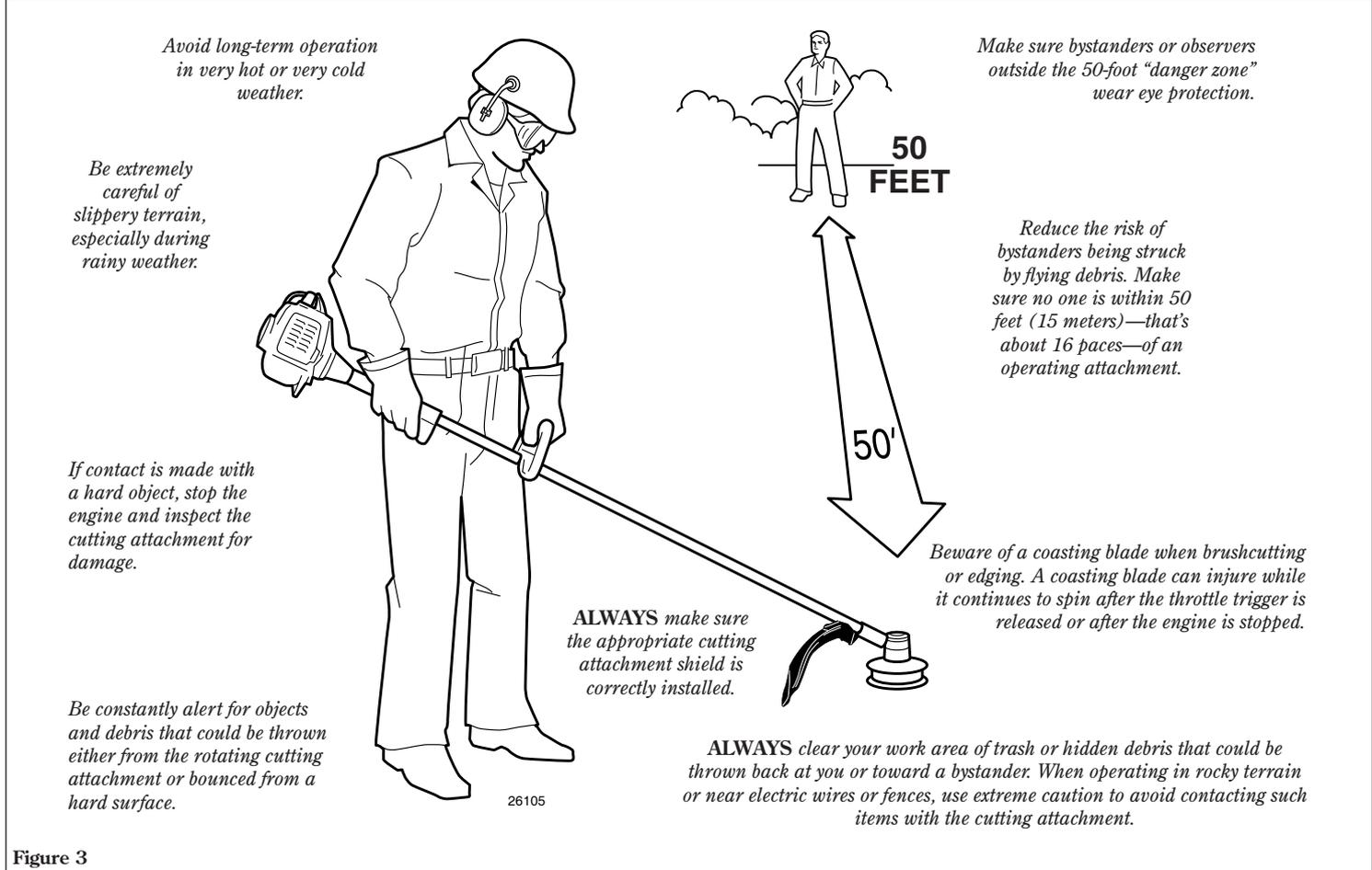


Figure 3

Unit Description

Using the accompanying illustrations as a guide, familiarize yourself with this unit and its various components. Understanding the product helps ensure top performance, long service life, and safer operation. See Figure 4.

WARNING!

Do not make unauthorized modifications or alterations to any of these units or their components.

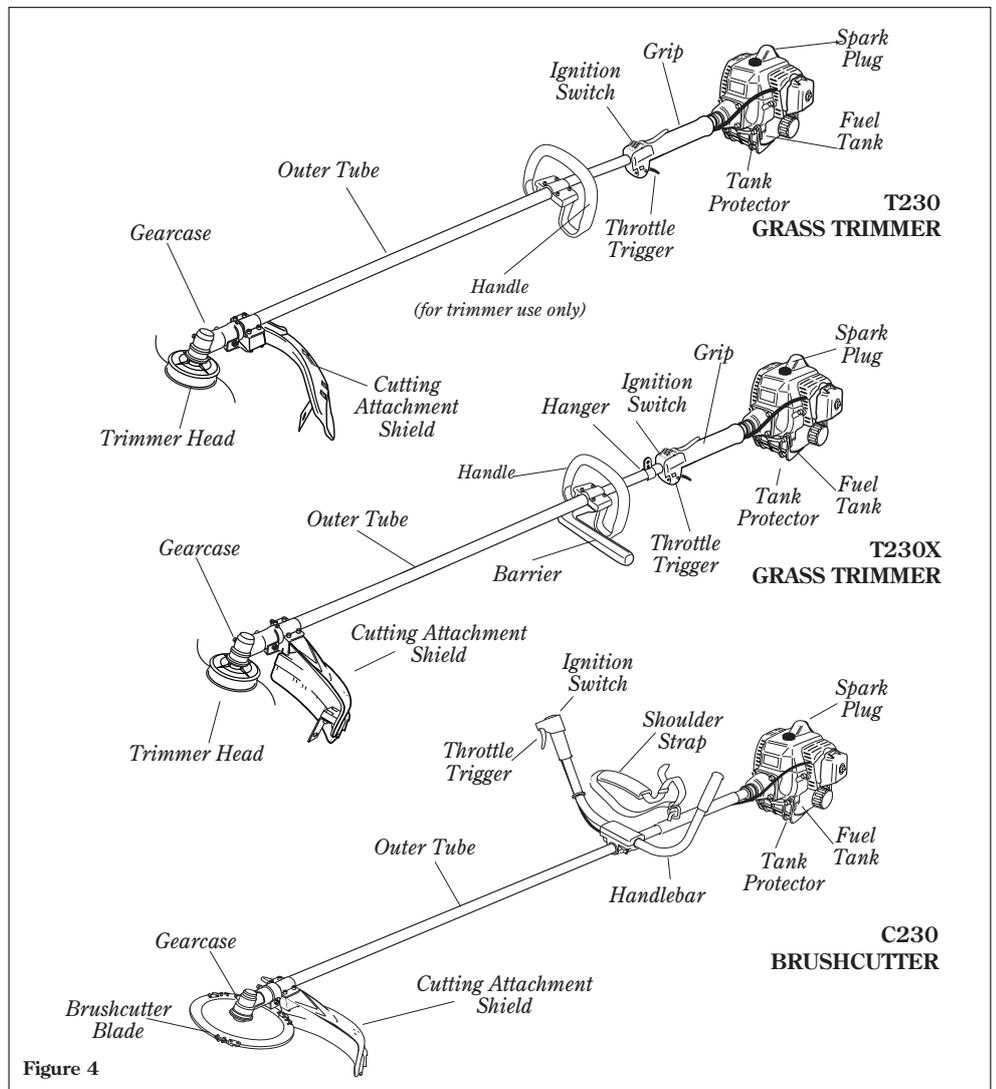


Figure 4

Specifications

T230 Dry Weight (less attachments)	4.6 kg/10.2 lb.
T230X Dry Weight (less attachments)	4.7 kg/10.4 lb.
C230 Dry Weight (less attachments)	4.9 kg/10.8 lb.
Engine Model	Shindaiwa S230
Engine Type	2-cycle, vertical-cylinder, air-cooled
Bore x Stroke	32 x 28 mm/1.26 x 1.10 in.
Displacement	22.5 cc/1.4 cu. in.
Maximum Power Output.....	1.1 HP (0.8 kW) @ 7500 RPM (min ⁻¹)
Fuel/Oil Ratio	50:1 with Shindaiwa Premium 2-cycle mixing oil

Fuel Tank Capacity	554 ml/18.7 oz.
Carburetor Type	Walbro WYL, diaphragm-type
Ignition	One-piece electronic, transistor-controlled
Spark Plug	Champion CJ8 (for EMC compliance use NGK BMR6A)
Air Cleaner Type	Non-reversible flocked filter element
Starting Method	Recoil
Stopping Method	Slide switch
Transmission Type	Automatic, centrifugal clutch w/bevel gear

*Specifications are subject to change without notice.

Prior to Assembly

Before assembling, make sure you have all the components required for a complete unit:

- Engine assembly.
- Outer tube assembly.
- Cutting attachment shield.
- Cutting attachment (trimmer head, or brushcutter blade).
- Correct operators handle (see page 8).

- Kit containing cutting attachment shield mounting bracket and hardware, operator's handle mounting bracket and hardware, gearcase tool holder, this manual and tool kit for routine maintenance. Tool kits vary by model and may include a hex wrench, spanner and a combination spark plug wrench/screwdriver.

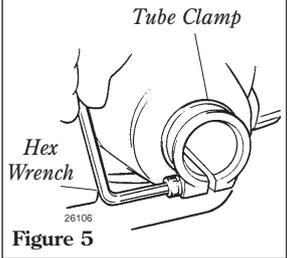
Carefully inspect all components for damage.

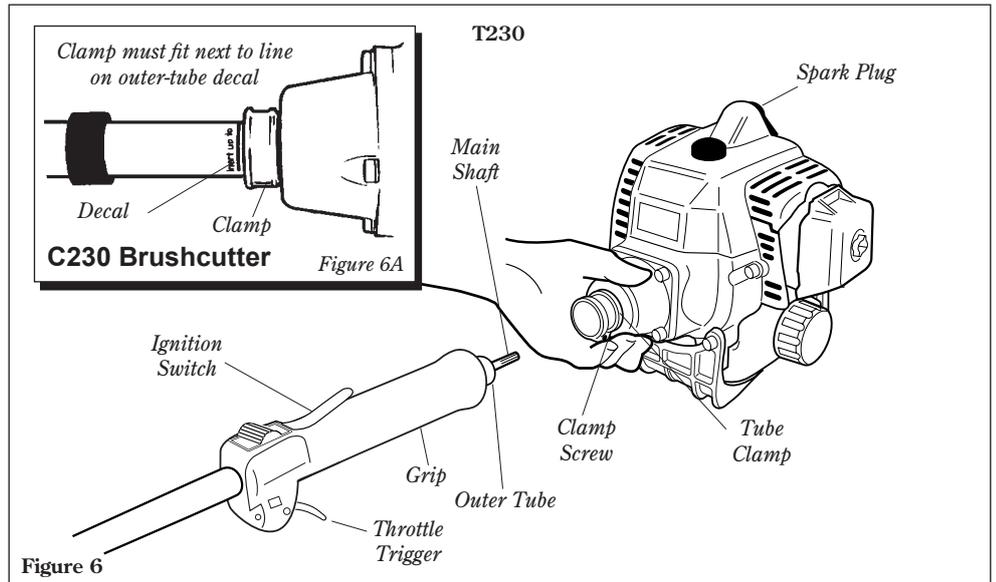
IMPORTANT!

The terms "left", "left-hand", and "LH"; "right", "right-hand", and "RH"; "front" and "rear" refer to directions as viewed by the operator during normal operation.

Assembly Driveshaft/Powerhead All Models

Connect the Outer Tube to the Powerhead.

1. Place the powerhead on a clean, flat surface, spark plug facing up. See Figure 6.
2. Use the 4 mm hex wrench to loosen the tube clamp screw.  **Figure 5**
3. Add some moly-type EP grease to the splines on the end of the mainshaft.
4. Slide the outer tube into the tube clamp until the tube bottoms. If installation is difficult, rotate the outer tube or mainshaft slightly until you feel the mainshaft splines engage with the powerhead.
5. Position the outer tube so that the ignition switch is facing up and the throttle trigger is down.



T230 Slide the outer tube into the powerhead until the throttle grip just contacts the tube clamp.

C230 Slide the outer tube into the powerhead until the installation decal aligns with the tube clamp. See Figure 6A.

6. Tighten the clamp screw firmly.

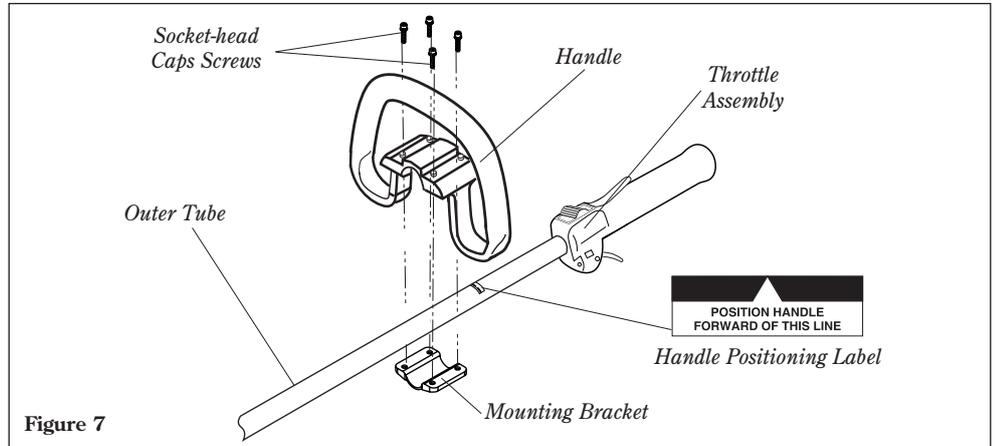
CAUTION!

Do not force the shaft tube into the powerhead! Excessive force can damage the shaft tube and mainshaft.

Assembly Handle

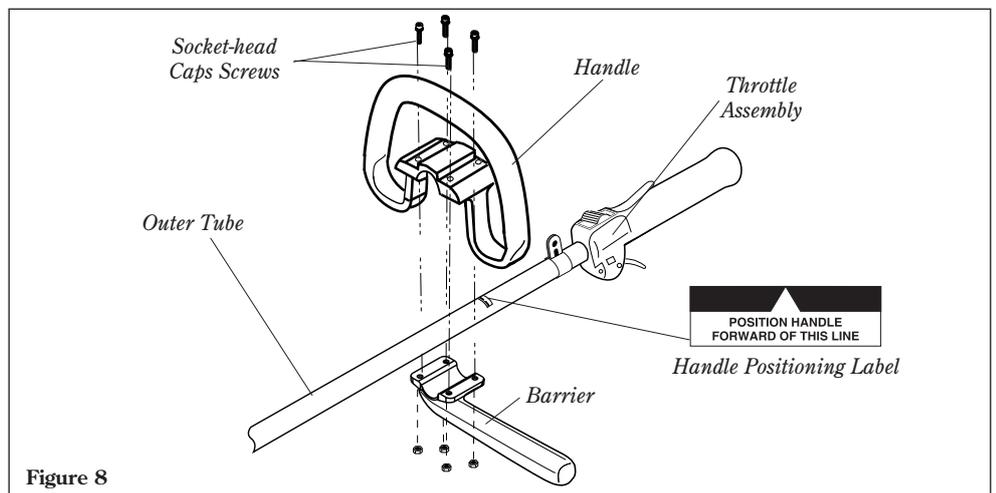
T230 - Connect the Handle to the Outer Tube.

1. Position the handle on the outer tube forward of Handle Positioning Label as shown in Figure 7.
2. Install the mounting bracket with the socket head cap screws. Tighten the screws finger-tight ONLY at this time.
3. Locate the handle in the best position for operator comfort (usually about 10 inches ahead of the throttle housing).
4. Secure the handle by alternately tightening the four socket-head screws in a diagonal or "crisscross" fashion.



T230X - Connect the Handle to the Outer Tube.

1. Position the handle on the outer tube forward of Handle Positioning Label as shown in Figure 8.
2. Install the barrier bar with the socket head cap screws and nuts. Tighten the screws finger-tight only at this time.
3. Locate the handle in the best position for operator comfort (usually about 10 inches ahead of the throttle housing).
4. Secure the handle by alternately tightening the four socket-head screws in a diagonal or "crisscross" fashion.



Assembly Handlebar C230

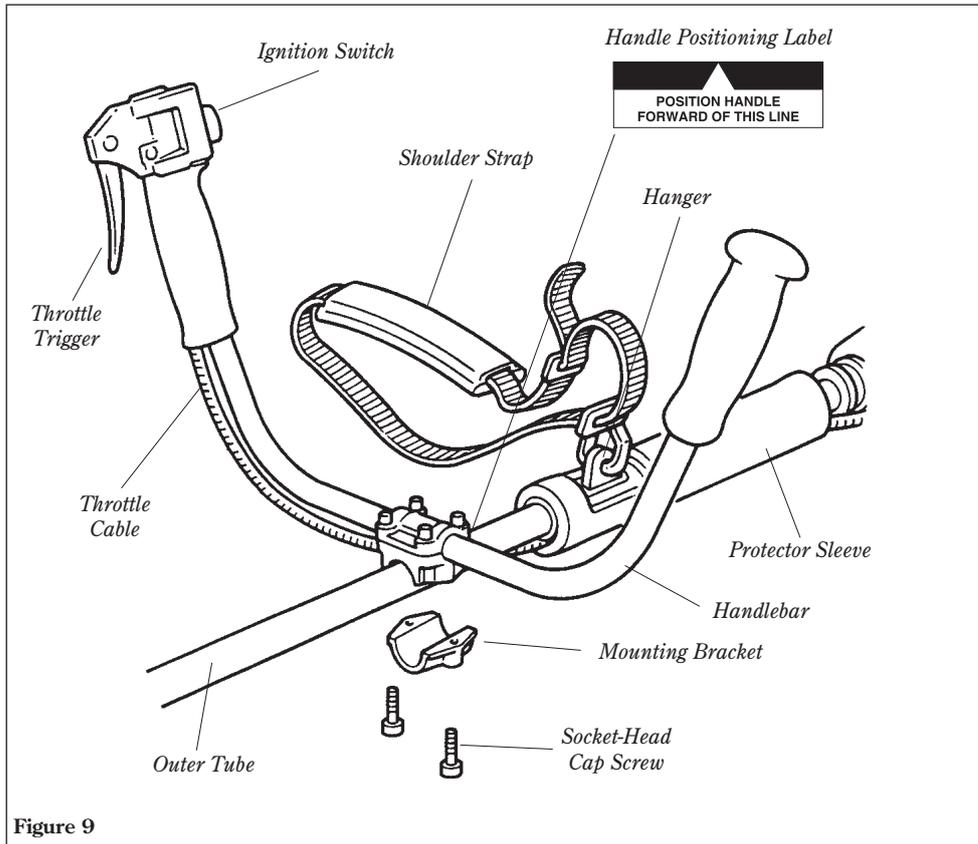


Figure 9

Assemble the Handlebar.

1. Position the handle over the outer tube. See Figure 9. Make sure the throttle lever is on the right-hand side of the outer tube.
2. Attach the handle mounting bracket using the two socket-head cap screws. Tighten the screws finger-tight ONLY at this time.
3. Locate the handle forward of the Handle Positioning Label at the best position for operator comfort.
4. Using the hex wrench, securely tighten the two handlebar cap screws.
5. Route the ribbed throttle cable tube along the handlebar and outer tube. See Figure 9. Install the protector sleeve on the outer tube.

Assembly Throttle Linkage and Ignition Leads All Models

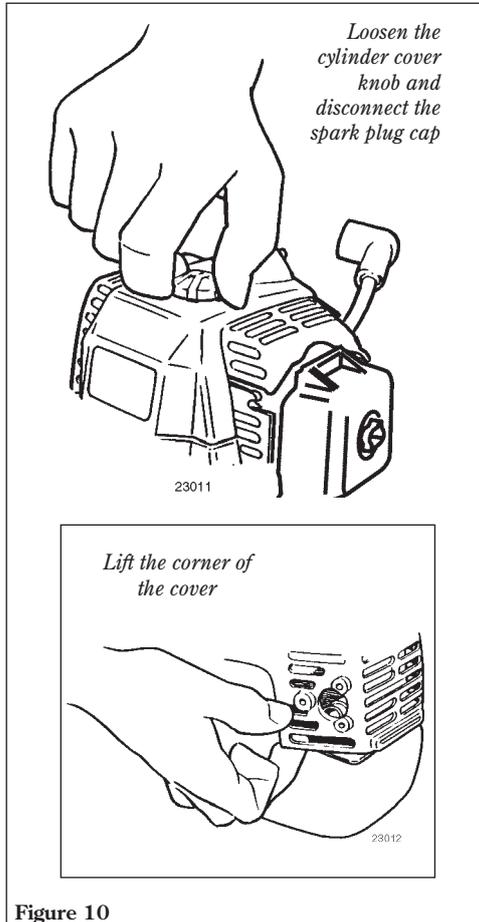


Figure 10

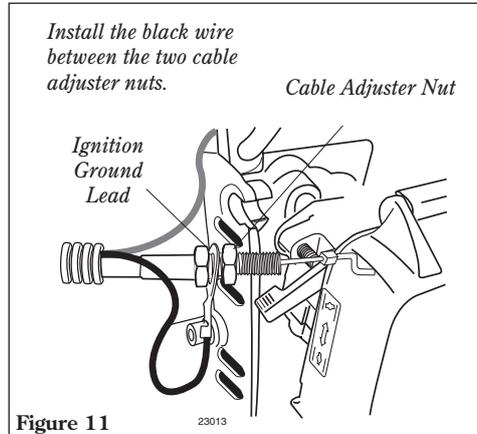


Figure 11

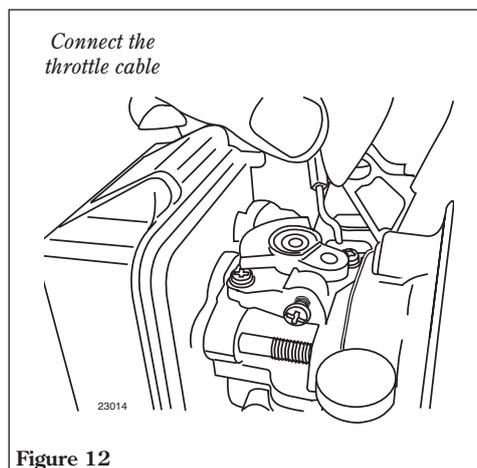


Figure 12

Remove the Cylinder Cover.

1. Remove the cap from the spark plug.
2. Loosen the black cylinder cover knob (about a dozen full turns are required), and then lift off the cylinder cover.

NOTE:

If the cover binds on the muffler outlet tube, pull gently on the corner of the cover as shown (see inset).

Connect the Throttle Cable.

1. Route the ribbed cable over the tube clamp to the top left side of the engine.
2. Install the black wire between the two cable adjuster nuts as shown. See Figure 11.
3. Connect the S-shaped end of the throttle cable to the throttle lever on top of the carburetor. See Figure 12.

Assembly Throttle Linkage and Ignition Leads All Models

Assemble and Adjust the Throttle Cable.

1. Insert the throttle-cable housing into the notch on the fan cover, and clamp the ground wire terminal between the fan cover and the outer cable adjuster nut. See Figure 13.
2. Tighten the two throttle cable adjuster nuts.

IMPORTANT!

Adjust and tighten the cable nuts to allow approximately 1/4-inch free play at the throttle trigger.

3. Using finger pressure only, connect the black ignition wire from the cable tube to the red ignition wire on the powerhead. Wire routing must be as shown in the illustration with the black wire located away from the throttle cable and carburetor linkage.
4. Reinstall the engine cover and tighten the captive engine cover screw.
5. Reinstall the spark plug boot.

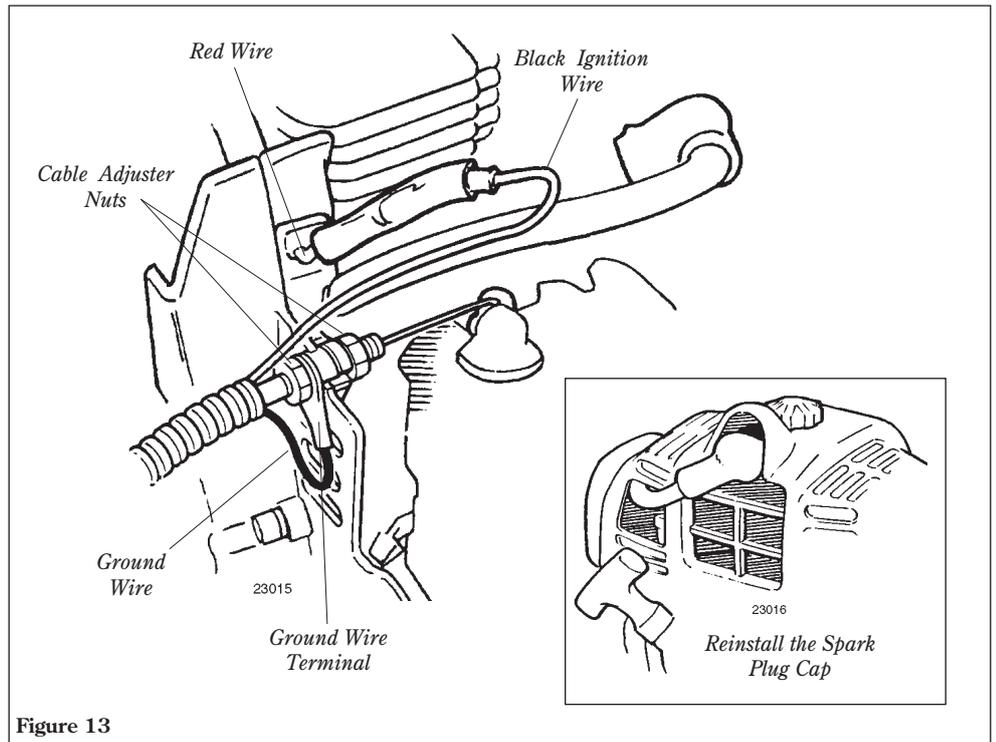


Figure 13

CAUTION!

Routing of wiring must not interfere with throttle operation.

Assembly

Cutting Attachment Shield All Models

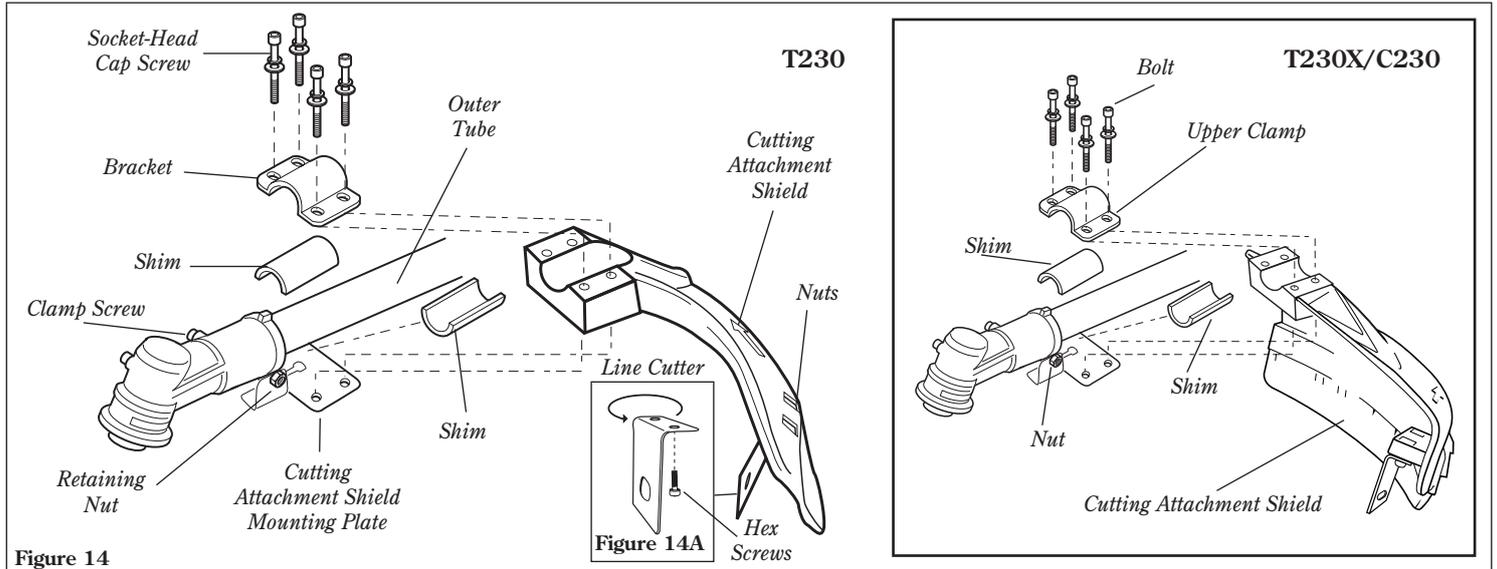


Figure 14

Install the Cutting Attachment Shield T230/T230X/C230.

1. Insert the cutting attachment shield between the outer tube and the cutting attachment shield mounting plate. See Figure 14.

NOTE:

It may be necessary to loosen the retaining nut and clamp screw to adjust cutting attachment shield mounting plate.

2. Fit the two shims and the bracket over the outer tube and loosely install the four socket-head cap screws. See Figure 14.
3. Tighten the four socket-head cap screws to secure the cutting attachment shield.

CAUTION!

Make sure the clamp screw and retaining nut are securely tightened before tightening the four socket-head cap screws.



WARNING!

NEVER operate the unit without the cutting attachment shield installed and tightly secured!

Sub-Shield T230X and C230.

(when trimmer head is in use)

1. Attach the shield extension to the cutting attachment shield.



WARNING!

NEVER use this machine without sub-shield when using a trimmer head.

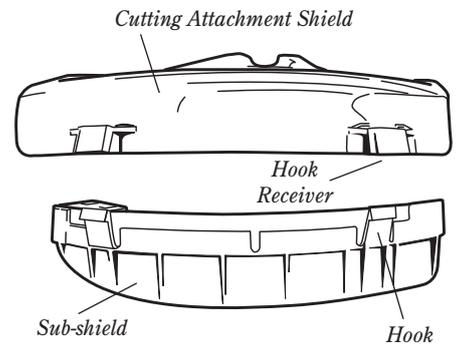


Figure 15

CAUTION!

Make sure the sub-guard is completely hooked at the hook receiver.

To Change Position of Line Cutter.

The line cutter can be positioned in 2 positions to obtain different line length for cutting.

1. Remove the 2 hex screws with a 4 mm hex wrench. See Figure 14A.
2. Rotate line cutter. See Figure 14A.

3. Reinstall the two hex screws and tighten them securely.



WARNING!

The line cutter is very sharp. Wear gloves to protect your hands when handling.

NOTE:

Be careful to not lose the 2 nuts in the cutting attachment shield, they are not captured.

Assembly Trimmer Head C230/T230/T230X

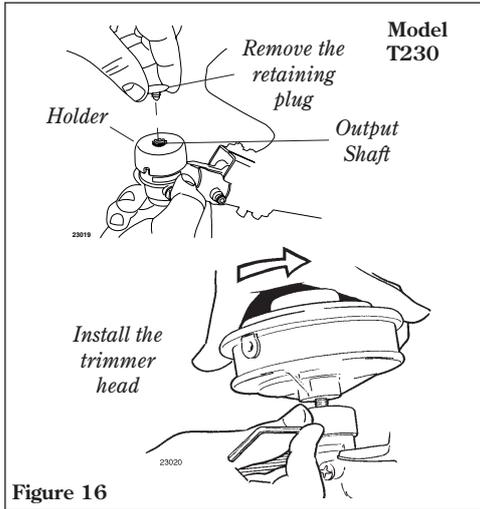


Figure 16

Install the Trimmer Head.

1. Turn the unit over so that the gearcase output shaft faces UP.
2. **(T230)** Remove and discard the plastic retaining plug. See Figure 16.
(T230X/C230) Remove the shaft bolt and bolt guard using the combination spark plug wrench/screwdriver. See Figure 17.

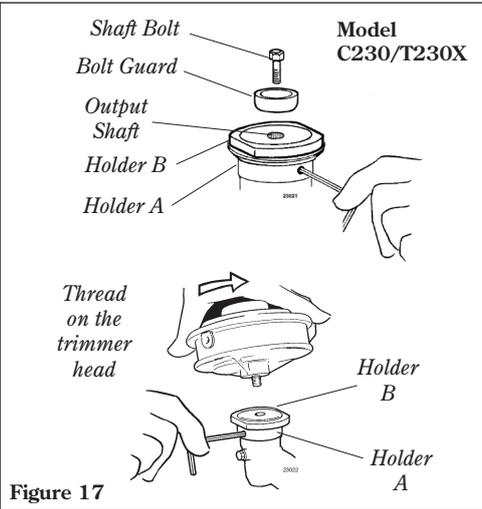


Figure 17

3. Rotate the holder until the hole in the holder aligns with the notch on the gearcase flange. Use the long end of the hex wrench to lock the output shaft in position. See Figure 16 or 17.

IMPORTANT!

The trimmer head has a left-hand thread. Turn the trimmer head counter-clockwise to install and clockwise to remove.

4. While holding the hex wrench, thread the trimmer head onto the output shaft, turning counter-clockwise.
5. Using hand pressure only, tighten the trimmer head firmly on the gearshaft.
6. Remove the hex wrench.
7. Adjust the trimmer line length to reach no further than the line cutter on the cutting attachment shield. Trim to the correct length if necessary.

WARNING!

A standard grass trimmer unit with loop handle should NEVER be operated with blade-type attachments. For blade use, the trimmer must be fitted with a bicycle-type handlebar or barrier bar that is located in front of the operator to reduce the risk of the operator coming in contact with the cutting attachment. (Per ANSI B175.3). When using a blade, the unit must be equipped with a harness or strap.

The 230 unit should now be completely assembled and ready for use as a grass trimmer.

Assembly Blade C230/T230X

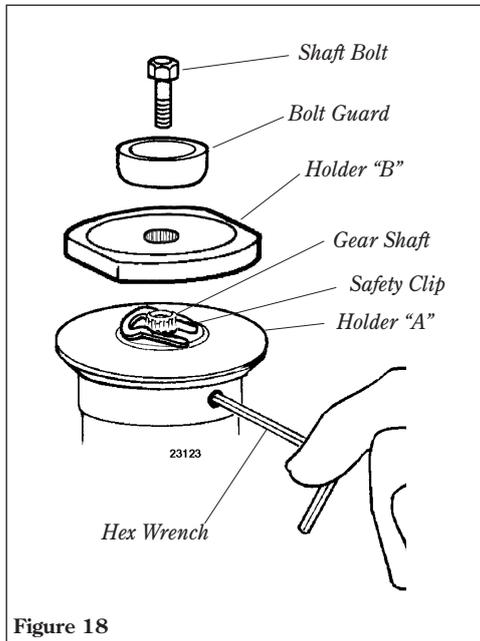


Figure 18

Mount the Blade.

Turn the brushcutter upside down so the gearcase output shaft is facing UP, and remove the shaft bolt, bolt guard and holder B from the gearcase shaft.

1. Align the hole in blade holder "A" with the matching hole in the gearcase flange, and then temporarily lock the

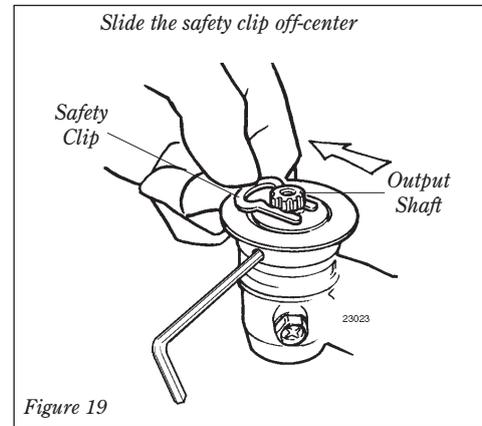


Figure 19

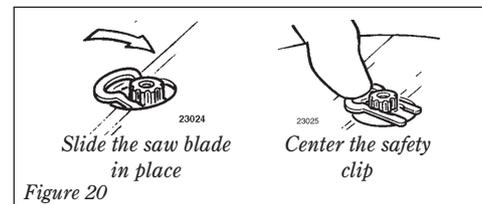


Figure 20

- output shaft by inserting a hex wrench through both holes. See Figure 18.
2. Slide the safety clip off-center. See Figure 18.
3. Fit the blade over the safety clip and then center it over the flange on holder "A". See Figure 19.

NOTE:

When installing certain blades, it may be necessary to temporarily remove the safety clip.

CAUTION!

Install the blade so its printed surface is visible to the operator when the brushcutter is in the normal operating position.

WARNING!

The blade must fit flat against the holder flange. The blade mounting hole must be centered over the raised boss on blade holder A.

4. Lock the blade in place by centering the safety clip on the output shaft. See Figure 18.

WARNING!

Never operate the brushcutter without the safety clip in place!

Assembly Blade C230/T230X (continued)

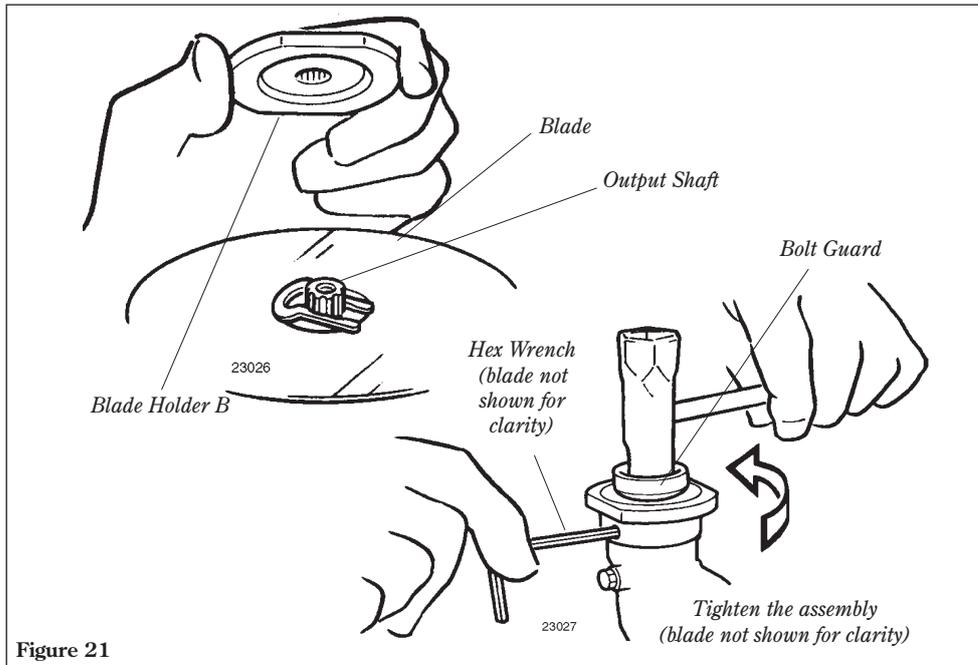


Figure 21

5. Install blade holder "B" on the output shaft. See Figure 21. The recess in the holder must completely cover the safety clip, and must fit tightly against the blade.
6. Install the bolt guard and then the blade retaining bolt. Using the combination spark plug wrench/screwdriver, tighten the bolt firmly in a counter-clockwise direction.
7. Remove the hex wrench.

The C230 Brushcutter should now be completely assembled.

Mixing Fuel

CAUTION!

- Some types of gasoline contain alcohol as an oxygenate. Oxygenated gasoline may cause increased operating temperatures. Under certain conditions, alcohol-based gasoline may also reduce the lubricating qualities of some 2-cycle mixing oils.
- Never use any type of gasoline containing more than 10% alcohol by volume! Generic oils and some outboard oils may not be intended for use in high-performance 2-cycle type engines, and should never be used in your Shindaiwa engine.

CAUTION!

This engine is designed to operate on a 50:1 mixture consisting of unleaded gasoline and 2-cycle mixing oil only. Use of non-approved mixing oils can lead to excessive carbon deposits.

- Use only fresh, clean unleaded gasoline with a pump octane of 87 or higher.
- Mix with 50:1 Shindaiwa Premium 2-cycle mixing oil or with an equivalent high quality 2-cycle mixing oil.

Examples of 50:1 mixing quantities

- 1 gallon of gasoline to 2.6 oz. mixing oil.
- 5 liters of gasoline to 100 ml. mixing oil.

IMPORTANT!

Mix only enough fuel for your immediate needs! If fuel must be stored longer than 30 days and ^{Shindaiwa} ONE oil with fuel stabilizer is not used, it should first be treated with a fuel stabilizer such as STA-BIL™.

Filling the Fuel Tank



WARNING!

Minimize the Risk of Fire!

- **STOP** engine before refueling.
- **ALWAYS** allow the engine to cool before refueling!
- Wipe all spilled fuel and move the engine at least 10 feet (3 meters) from the fueling point and source before restarting!
- **NEVER** start or operate this unit if there is a fuel leak.
- **NEVER** start or operate this unit if the carburetor, fuel lines, fuel tank and/or fuel tank cap are damaged.
- **NEVER** smoke or light any fires near the engine or fuel source!
- **NEVER** place any flammable material near the engine muffler!
- **NEVER** operate the engine without the muffler and spark arrester in good working condition.

1. Place the unit on a flat, level surface.
2. Clear any dirt or other debris from around the fuel filler cap.
3. Remove the fuel cap, and fill the tank with clean, fresh fuel.
4. Reinstall the fuel filler cap and tighten firmly.

Starting the Engine

IMPORTANT!

Engine ignition is controlled by a two position switch mounted on the throttle housing labeled, "I" for ON or START and "O" for OFF or STOP.

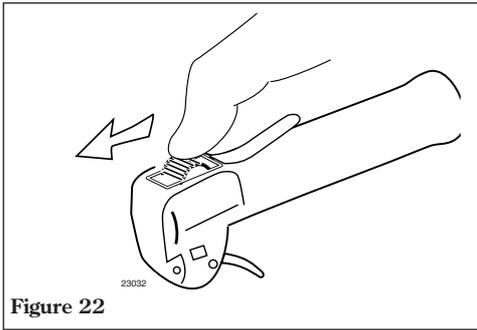


Figure 22

1. Slide the ignition switch to the "I" position (engine ON).

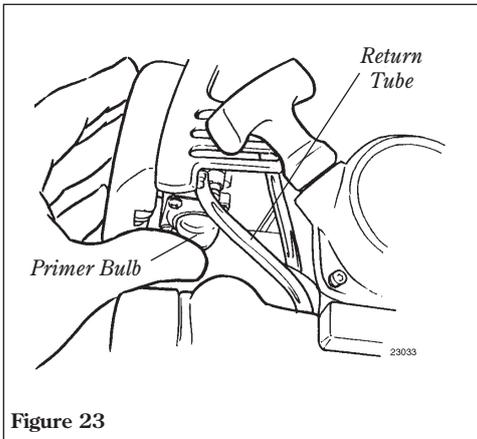


Figure 23

2. Press the primer bulb until fuel can be seen flowing in the transparent return tube.

IMPORTANT!

The primer system only pushes fuel through the carburetor. Repeatedly pressing the primer bulb will not flood the engine with fuel.

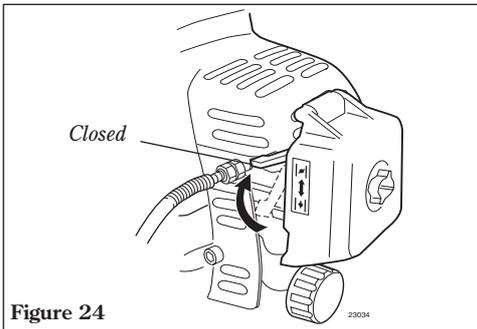


Figure 24

3. **(Cold Engine Only)** Set the choke lever to the CLOSED position.

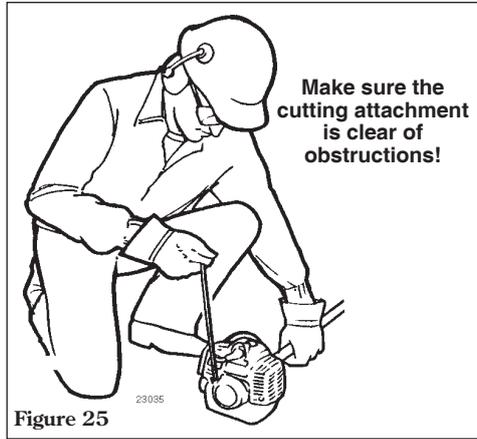


Figure 25

4. While holding the outer tube firmly with one hand, slowly pull the recoil starter handle until resistance is felt, then pull quickly to start the engine.

CAUTION!

Do not pull the recoil starter to the end of the rope travel. Pulling the recoil starter to the end of the rope travel can damage the starter.



WARNING!

The cutting attachment may rotate when the engine is started!

5. When the engine starts, slowly move the choke lever to the "OPEN" position. See Figure 26. (If the engine stops after the initial start, close the choke and restart.)

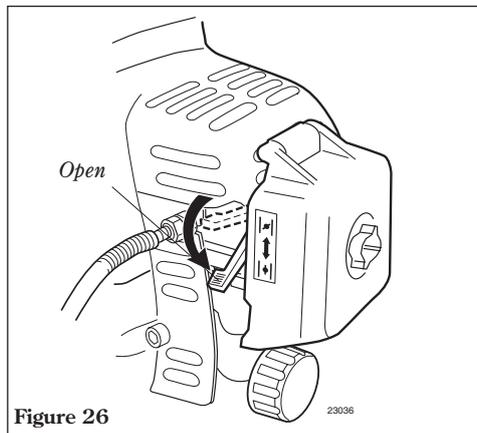


Figure 26



WARNING!

Never start the engine from the operating position.

IMPORTANT!

If the engine fails to start after several attempts with the choke in the closed position, the engine may be flooded with fuel. If flooding is suspected, move the choke lever to the open position and repeatedly pull the recoil starter to remove excess fuel and start the engine. If the engine still fails to start, refer to the troubleshooting section of this manual.

When the Engine Starts...

- After the engine starts, allow the engine to warm up at idle 2 or 3 minutes before operating the unit.
- After the engine is warm, pick up the unit and clip on the harness if so equipped. See page 13.
- Advancing the throttle makes the cutting attachment turn faster; releasing the throttle permits the attachment to stop turning. If the cutting attachment continues to rotate when the engine returns to idle, carburetor idle speed should be adjusted (page 13).

Stopping the Engine

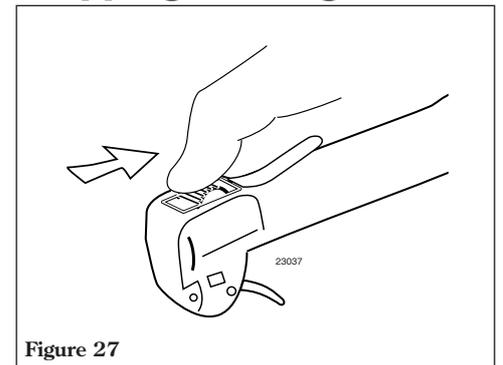
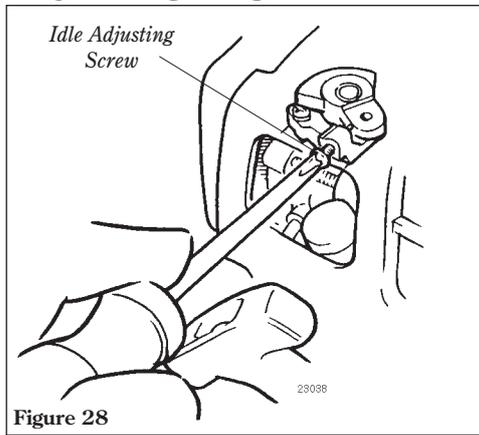


Figure 27

Idle the engine briefly before stopping (about 2 minutes), then slide the ignition switch to the "O" (Engine OFF) position.

Adjusting Engine Idle



The engine must return to idle speed whenever the throttle lever is released. Idle speed is adjustable, and must be set low enough to permit the engine clutch to disengage the cutting attachment.

Idle Speed Adjustment



WARNING!

The cutting attachment must NEVER rotate at engine idle! If the idle speed cannot be adjusted by the procedure described here, return the unit to your Shindaiwa dealer for inspection.

1. Place the unit on the ground, then start the engine, and then allow it to idle 2-3 minutes until warm.
2. If the attachment rotates when the engine is at idle, reduce the idle speed by turning the idle adjustment screw counter-clockwise. See Figure 26.
3. If a tachometer is available, the engine idle speed should be final adjusted to 2,750 (± 250) RPM (min^{-1}).
4. Carburetor fuel mixture adjustments are preset at factory on units with emission control systems and cannot be serviced in the field.

Checking Unit Condition

NEVER operate the unit with the cutting attachment shield or other protective devices (harness, ignition switch, blade retention clip, etc.) removed!



WARNING!

A cutting attachment shield or other protective device is no guarantee of protection against ricochet. **YOU MUST ALWAYS GUARD AGAINST FLYING DEBRIS!**

Use only authorized Shindaiwa parts and accessories with your Shindaiwa trimmer, brushcutter, or lawn edger. Do not make modifications to this unit without the written approval of Shindaiwa, Inc.

ALWAYS make sure the cutting attachment is properly installed and firmly tightened before operation.

NEVER use a cracked or warped cutting attachment: If a properly installed attachment vibrates, replace the attachment with new one and re-check.

ALWAYS stop the engine immediately and check for damage if you strike a foreign object or if the unit becomes tangled. Do not operate with broken or damaged equipment.

NEVER allow the engine to run at high RPM without a load. Doing so could damage the engine.

NEVER operate a unit with worn or damaged fasteners or attachment holders.

NEVER cut with a dull blade. Doing so will increase the risk of blade thrust and may also cause equipment damage.

Shoulder Strap

Adjust the shoulder strap so the shoulder pad rests comfortably on the off-side shoulder and the cutting path of the cutting attachment is parallel to the ground. Make sure all hooks and adjustment devices are secure.

Optional Accessories

Shoulder Strap.....	P/N 22410-17202
Hanger.....	P/N 22410-12210
Hanger Bolt.....	P/N 01020-05120
Hanger Nut.....	P/N 01500-05041

Grass Trimming

NOTE:

Although a shoulder strap accessory is not required for use with a grass trimmer, a shoulder strap can increase operator comfort during extended periods of operation. See Figure 29.

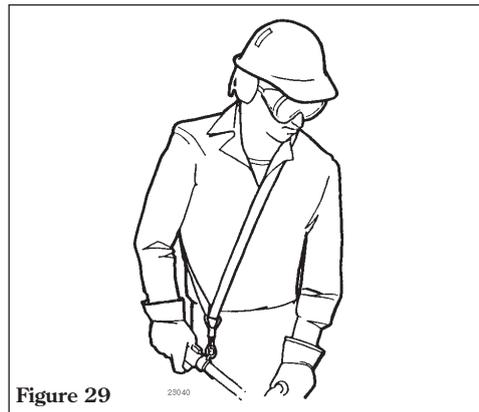


Figure 29

Using a Blade



WARNING!

Always wear a shoulder strap when operating this unit with a blade. A shoulder strap is also recommended when using trimmer line.

NOTE:

Using a shoulder strap with a brush-cutter allows you to maintain proper control of the unit and reduces fatigue during extended operation.

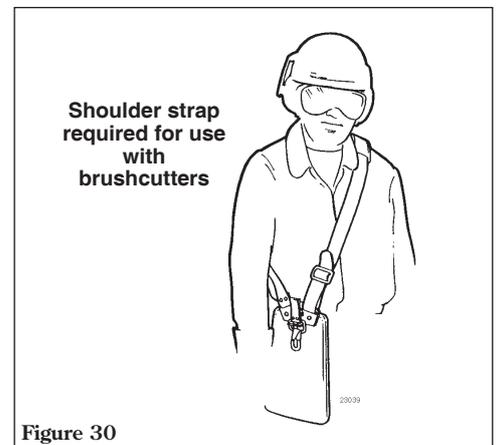


Figure 30

Using a Grass Trimmer T230

Your Shindaiwa T230 Grass Trimmer may be equipped with one of several Shindaiwa trimmer head models, each with features for specific applications and/or operational requirements.

NOTE:

A grass trimmer head can also be fitted to the Shindaiwa C230 Brushcutter.

For proper operation, always refer to the instructions accompanying the trimmer head being used. Available trimmer head styles include:

- **Semi-automatic.** Trimmer line is indexed when the operator taps the trimmer head on the ground during operation.
- **Manual.** The operator indexes line manually with the grass trimmer stopped.

- **Fixed.** The operator must stop the unit and add new lengths of trimmer line manually.
- **Flail.** This device, designed for clearing weeds and light brush, features three nylon blades attached to the head by pivots.

CAUTION!

Do not push the rotating line into trees, wire fences or any material that could tangle or break line ends.

Engine Operating Speeds

Operate at full throttle while cutting grass.

CAUTION!

Operation at low RPM can lead to premature clutch failure.

Trimming and Mowing Grass

Hold the grass trimmer so the trimmer head is angled slightly into the area to be cut. To ensure maximum trimmer-line service life, cut only with the tip of the trimmer line. Cut grass by swinging the unit's trimmer head from left to right. Keep the trimmer head horizontal.



Figure 31

Edging

Tilt the handle about 100° to the left (from horizontal) and move forward, holding the trimmer vertically as shown.

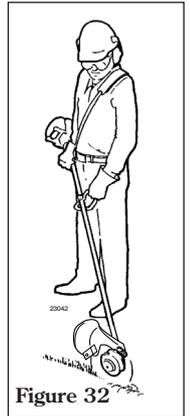


Figure 32

Using A Brushcutter Blade C230/T230X

WARNING!

- Before working with a blade-equipped unit, always inspect and clean the area of objects that could interfere with or damage the blade.
- Never use a blade near sidewalks, fence posts, buildings or other objects that could cause injury or damage.
- Never use a blade for purposes other than those for which it was designed.
- Whenever you strike a hard object with a blade, always stop the brushcutter and carefully inspect the blade for damage. **NEVER OPERATE THE BRUSHCUTTER WITH A DAMAGED BLADE!**
- A blade-equipped unit **must** be equipped with a bicycle-type handlebar as well as a harness or strap.
- Always make sure the cutting attachment shield is properly installed before operating the unit.

Blade Thrust

'Blade thrust' is a sudden sideways or backward motion of the brushcutter. Such motion may occur when the blade jams or catches on an object such as a sapling tree or tree stump. **BE CONSTANTLY ALERT FOR BLADE THRUST AND GUARD AGAINST ITS EFFECTS!**

WARNING!

When cutting wood with a blade, feed the blade slowly. *Never strike or "slam" a spinning blade against the wood.*

Brushcutter Handlebar

A brushcutter's handlebar helps prevent the operator from moving forward, or the unit moving rearward, thus preventing inadvertent bodily contact with the blade. **ALWAYS KEEP THE HANDLEBAR SECURELY IN PLACE ON THE UNIT!**

Brushcutter Harness

A harness provides additional protection against blade thrust. In addition, a harness gives significant support and comfort to help ensure safe and efficient operation.

When operating a brushcutter, make sure both the handle and harness are adjusted to the size of the operator using the unit.

Engine Operating Speeds

Operate the engine at full throttle while cutting. Best fuel efficiency is obtained by releasing the throttle when swinging back after a cut.

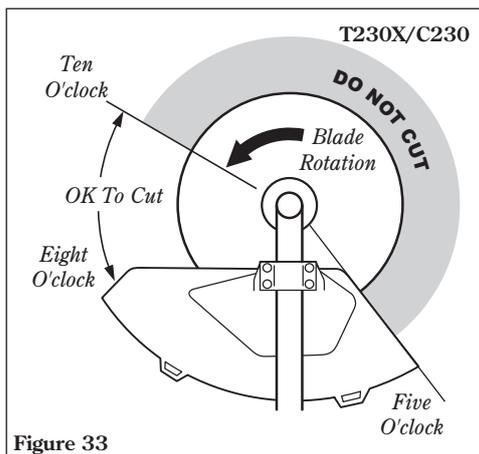
- To prevent possible engine damage, do not allow the brushcutter to run at high speeds without a load.
- Avoid operating the attachment at low speeds. Doing so can lead to rapid clutch wear. In addition, slow-speed operation tends to cause grass and debris to wrap around the cutting head.

WARNING!

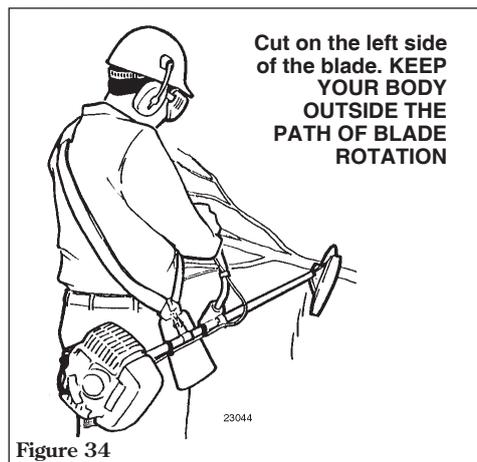
DO NOT use 2-tooth or NON-Shindaiwa approved 4-tooth cutting blades with Shindaiwa brushcutters.

The blade rotates counter-clockwise. For best performance and to minimize being struck by debris, move the blade from right to left while advancing on your work.

(T230X, C230) Position the blade so cuts are made between the blade's 8 o'clock and 10 o'clock positions (as viewed from above). **DO NOT** cut between the 10 o'clock and 5 o'clock positions (shaded area). See Figure 33.



Vertical Cuts



Hold the brushcutter with the blade at a 90° angle to the ground so the blade's bottom edge rotates toward the operator. Move the blade from top to bottom through the cut, and cut *only* with the bottom edge of the blade.

WARNING!

When making vertical cuts, never allow the blade to exceed waist height.

General Maintenance

IMPORTANT!

MAINTENANCE, REPLACEMENT OR REPAIR OF EMISSION CONTROL DEVICES AND SYSTEMS MAY BE PERFORMED BY ANY REPAIR ESTABLISHMENT OR INDIVIDUAL; HOWEVER, WARRANTY REPAIRS MUST BE PERFORMED BY A DEALER OR SERVICE CENTER AUTHORIZED BY SHINDAIWA CORPORATION THE USE OF PARTS THAT ARE NOT EQUIVALENT IN PERFORMANCE AND DURABILITY TO AUTHORIZED PARTS MAY IMPAIR THE EFFECTIVENESS OF THE EMISSION CONTROL SYSTEM AND MAY HAVE A BEARING ON THE OUTCOME OF A WARRANTY CLAIM.



WARNING!

Before performing any maintenance, repair or cleaning work on the unit, make sure the engine and cutting attachment are completely stopped. Disconnect the spark plug wire before performing service or maintenance work.



WARNING!

Non-standard parts may not operate properly with your unit and may cause damage and lead to personal injury.

NOTE:

Using non-standard replacement parts could invalidate your Shindaiwa warranty.

Muffler

This unit must never be operated with a faulty or missing spark arrester or muffler. Make sure the muffler is well secured and in good condition. A worn or damaged muffler is a fire hazard and may also cause hearing loss.

Spark Plug

Keep the spark plug and wire connections tight and clean.

Fasteners

Make sure nuts, bolts, and screws (except carburetor adjusting screws) are tight.

Blades

Keep blades sharp and check blade condition frequently. If a blade's performance changes suddenly, stop the engine and check the blade for cracks or other damage. Replace a damaged blade IMMEDIATELY!



WARNING!

- Never repair a damaged blade by welding, straightening, or by modifying its shape. An altered blade may break during operation, resulting in serious personal injury.
- DO NOT use 2-tooth or NON-Shindaiwa approved 4-tooth cutting blades on Shindaiwa trimmers or brushcutters.
- Blades are **not** interchangeable between Shindaiwa edgers and trimmer/brushcutter models. Operating any unit with a blade or attachment not approved for that unit can be hazardous and may cause serious injury.

Daily Maintenance

Prior to each work day, perform the following:

- Remove all dirt and debris from the engine, check the cooling fins and air cleaner for clogging, and clean as necessary.
- Carefully remove any accumulations of dirt or debris from the muffler and fuel tank. Dirt build-up in these areas can lead to engine overheating, fire, or premature wear.
- Check for loose or missing screws or components. Make sure the cutting attachment is securely fastened.
- Check the entire unit for leaking fuel or grease.

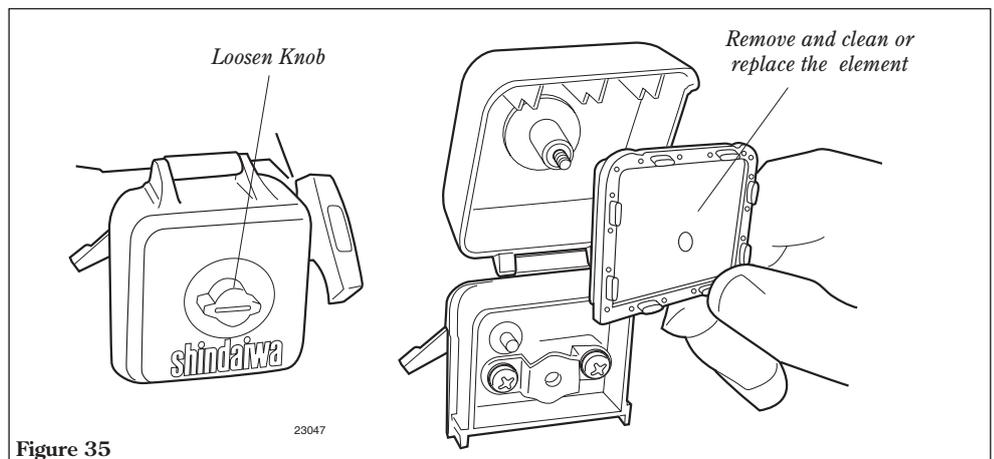
10-Hour Maintenance

Every 10 hours of operation (more frequently in dusty or dirty conditions):

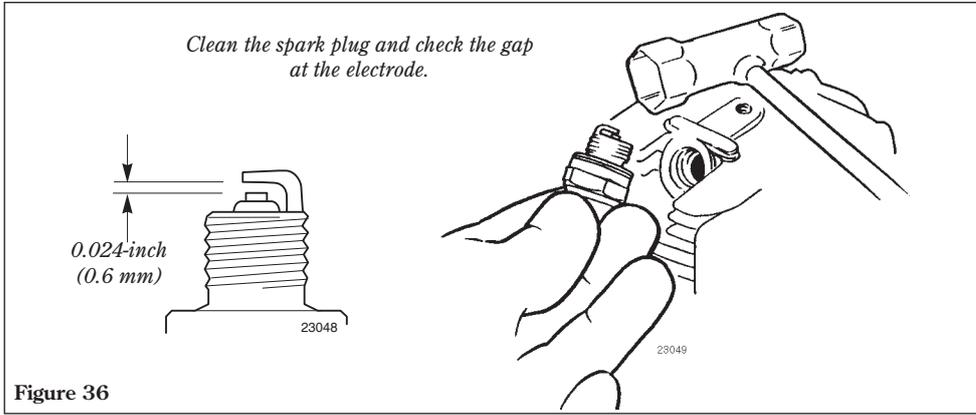
- Remove the air cleaner element from the carburetor and clean it thoroughly with soap and water or compressed air, let dry before reinstalling the element.

CAUTION!

Do not operate the machine if the air cleaner or element is damaged, or if the element is wet.



10/15-Hour Maintenance



Every 10 to 15 hours of operation:
Remove and clean the spark plug.

■ Adjust the spark plug electrode gap to 0.024-inch (0.6 mm). If the plug must be replaced, use only a Champion CJ8 or equivalent spark plug of the correct heat range. For electromagnetic compliance (EMC), use NGK BMR6A.

CAUTION!

Before removing the spark plug, clean the area around the plug to prevent dirt and debris from getting into the engine's internal parts

50-Hour Maintenance

Every 50 hours of operation

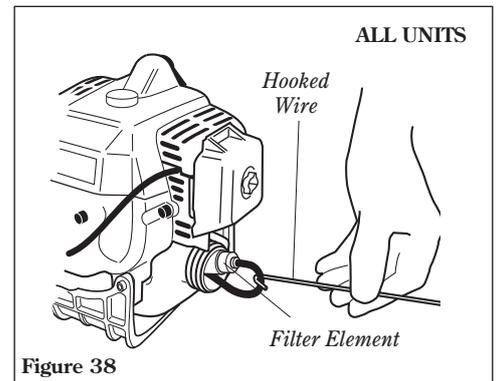
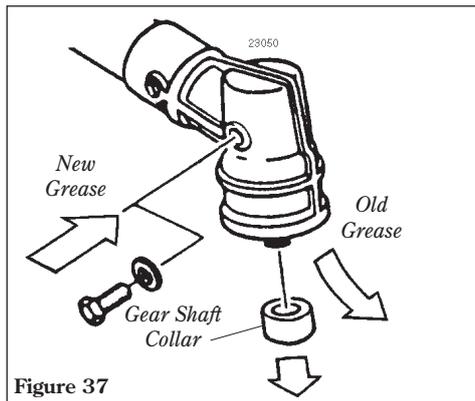
(more frequently in dusty or dirty conditions):

- Remove and clean the cylinder cover and clean grass and dirt from the cylinder fins.
- Remove the cutting attachment, holder and the gear shaft collar. Remove the filler plug from the side of the gearcase and press new grease into the gearcase until the old grease has been pushed out. Use only lithium-base grease such as Shindaiwa Gearcase Lubricant or equivalent. See Figure 37.
- Use a hooked wire to extract the fuel filter from inside the fuel tank. Remove and replace the filter element. Before reinstalling the filter, inspect the condition of the fuel line. If damage or deterioration are noted, the unit should

be removed from service until it can be inspected by a Shindaiwa-trained service technician. See Figure 38.

CAUTION!

Make sure you do not pierce the fuel line with the end of the hooked wire, the line is delicate and can be damaged easily.



135-Hour Maintenance

After every 135 hours of operation or if engine becomes hard to start and has low power. The spark arrester screen should be inspected and cleaned.



WARNING!

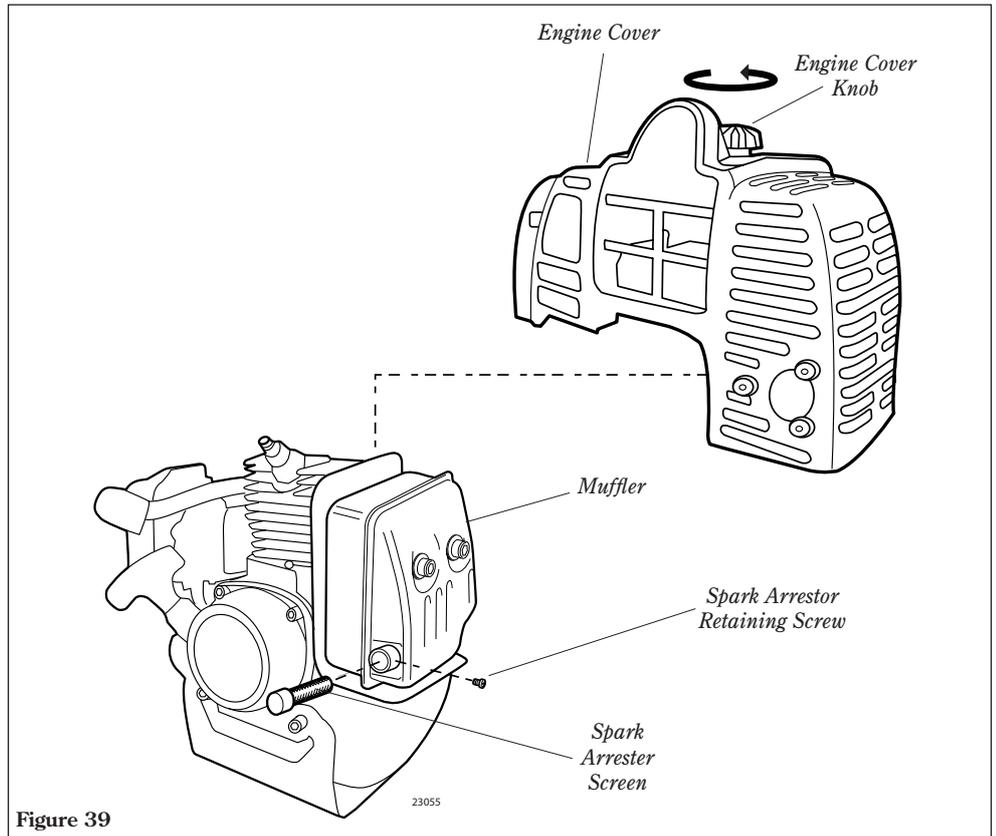
Never operate the unit with a damaged or missing muffler or spark arrester! Operating with missing or damaged exhaust components is a fire hazard and could also damage your hearing.

1. Remove the spark plug boot.
2. Remove the engine cover by loosening the engine cover knob (the knob is captive) and lifting the cover from the engine.
3. Remove the spark arrester screen screw.
4. Remove the spark arrester screen and clean with a stiff bristle brush.

IMPORTANT!

If carbon deposits are severe or if no performance improvement is noted, this unit should be inspected by an authorized Shindaiwa servicing dealer.

5. Reassemble the spark arrester screen and engine cover in reverse order.



Long Term Storage

Whenever the unit will not be used for 30 days or longer, use the following procedures to prepare it for storage:

- Clean external parts thoroughly.
- Drain all the fuel from the carburetor and the fuel tank.

IMPORTANT!

All stored fuels should be stabilized with a fuel stabilizer such as STA-BIL™.

To remove the remaining fuel from the fuel lines and carburetor and with the fuel drained from the fuel tank.

1. Prime the primer bulb until no more fuel is passing through.
2. Start and run the engine until it stops running.
3. Repeat steps 1 and 2 until the engine will no longer start.

CAUTION!

Gasoline stored in the carburetor for extended periods can cause hard starting, and could also lead to increased service and maintenance costs.

- Remove the spark plug and pour about 1/4 ounce of 2-cycle mixing oil into the cylinder through the spark plug hole. Slowly pull the recoil starter 2 or 3 times so oil will evenly coat the interior of the engine. Reinstall the spark plug.
- Before storing the unit, repair or replace any worn or damaged parts.
- Remove the air cleaner element from the carburetor and clean it thoroughly with soap and water, let dry and reassemble the element.
- Store the machine in a clean, dust-free area.

Blade Sharpening

When the cutting edges of the blade become dull, they can be resharpened with a few strokes of a file.

In order to keep the blade in balance, all cutting edges must be sharpened equally.

Shindaiwa Tornado™ Blade

To sharpen the cutters on a Shindaiwa Tornado Blade, use a 7/32-inch round file. File the leading edge of each tooth to a razor edge. The top plate of each tooth should angle back 30°.

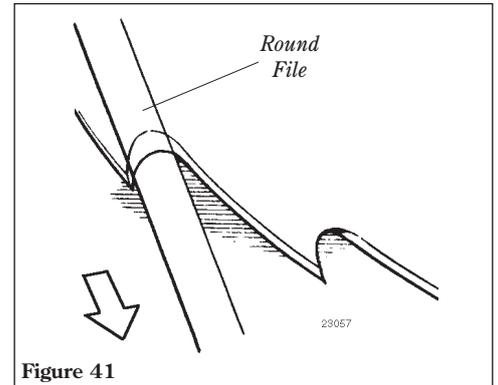
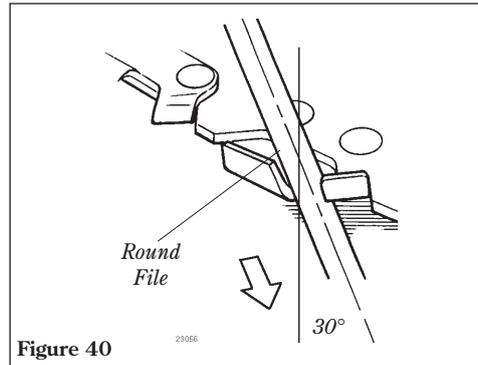


WARNING!

Sharpen only the cutting teeth of a blade. DO NOT alter the contour of the blade in any way.

Multiple-tooth Circular Blade

Use a round file to maintain a radius of 0.04 to 0.06" (1 to 1.5 mm) at the base of each tooth. Cutting edges must be offset equally on each side.



Troubleshooting Guide

ENGINE DOES NOT START

What To Check	Possible Cause	Remedy
Does the engine crank? ↓ YES	NO Faulty recoil starter. Fluid in the crankcase. Internal damage.	Consult with an authorized servicing dealer.
Good compression? ↓ YES	NO Loose spark plug. Excess wear on cylinder, piston, rings.	Tighten and re-test. Consult with an authorized servicing dealer.
Does the tank contain fresh fuel of the proper grade? ↓ YES	NO Fuel incorrect, stale, or contaminated; mixture incorrect.	Refill with fresh, clean unleaded gasoline with a pump octane of 87 or higher, mixed with Shindaiwa Premium 2-cycle mixing oil at a 50:1 gasoline/oil ratio.
Is fuel visible and moving in the return line when priming? ↓ YES	NO Check for clogged fuel filter and/or vent.	Replace fuel filter or vent as required. Restart.
Is there spark at the spark plug wire terminal? ↓ YES	NO The ignition switch is in "O" (OFF) position. Shorted ignition ground. Faulty ignition unit.	Move switch to "I" (ON) position and re-start. Consult with an authorized servicing dealer.
Check the spark plug.	If the plug is wet, excess fuel may be in the cylinder. The plug is fouled or improperly gapped. The plug is damaged internally or of the wrong size.	Crank the engine with the plug removed, reinstall the plug, and restart. Clean and regap the plug to 0.024" (0.6 mm). Restart. Replace the plug with a Champion CJ8 or equivalent type spark plug of the correct heat range. For EMC compliance, use NGK BMR6A. Restart.

LOW POWER OUTPUT

What To Check	Possible Cause	Remedy
Is the engine overheating?	Operator is overworking the unit. Carburetor mixture is too lean. Improper fuel ratio. Fan, fan cover, cylinder fins dirty or damaged. Carbon deposits on the piston or in the muffler.	Shorten trimmer line. Cut at a slower rate. Consult with an authorized servicing dealer. Refill with fresh, clean unleaded gasoline with a pump octane of 87 or higher, mixed with Shindaiwa Premium 2-cycle mixing oil at a 50:1 gasoline/oil ratio Consult with an authorized servicing dealer.
Engine is rough at all speeds. May also have black smoke and/or unburned fuel at the exhaust.	Clogged air filter. Loose or damaged spark plug. Air leakage or clogged fuel line. Water in the fuel. Piston seizure. Faulty carburetor and/or diaphragm.	Clean or replace the air filter. Tighten or replace the plug with a Champion CJ8 or equivalent type spark plug of the correct heat range. For EMC compliance, use NGK BMR6A. Restart. Repair or replace fuel filter and/or fuel line. Refill with fresh fuel/oil mixture. See page 11. Consult with an authorized servicing dealer.
Engine is knocking.	Overheating condition. Improper fuel. Carbon deposits in the combustion chamber.	See above. Check fuel octane rating; check for presence of alcohol in the fuel (page 11). Refuel as necessary. Consult with an authorized servicing dealer.

Troubleshooting Guide (continued)

ADDITIONAL PROBLEMS

Symptom	Possible Cause	Remedy
Poor acceleration.	<ul style="list-style-type: none"> Clogged air filter. Clogged fuel filter. Lean fuel/air mixture. Idle speed set too low. 	<ul style="list-style-type: none"> Clean or replace the air filter. Replace the fuel filter. Consult with an authorized servicing dealer. Adjust: 2,750 (±250) RPM (min⁻¹).
Engine stops abruptly.	<ul style="list-style-type: none"> Switch turned off. Fuel tank empty. Clogged fuel strainer. Water in the fuel. Shorted spark plug or loose terminal. Ignition failure. Piston seizure. 	<ul style="list-style-type: none"> Reset the switch and restart. Refuel. See page 11. Replace strainer. Drain; replace with clean fuel. See page 11. Clean or replace spark plug with a Champion CJ8 or equivalent type spark plug of the correct heat range. For EMC compliance, use NGK BMR6A. Tighten the terminal. Replace the ignition unit. Consult with an authorized servicing dealer.
Engine difficult to shut off.	<ul style="list-style-type: none"> Ground (stop) wire is disconnected, or switch is defective. Overheating due to incorrect spark plug. Overheated engine. 	<ul style="list-style-type: none"> Test and replace as required. Replace spark plug with a Champion CJ8 or equivalent type spark plug of the correct heat range. For EMC compliance, use NGK BMR6A. Idle engine until cool.
Cutting attachment rotates at engine idle.	<ul style="list-style-type: none"> Engine idle too high. Broken clutch spring or worn clutch spring boss. Loose attachment holder. 	<ul style="list-style-type: none"> Set idle: 2,750 (±250) RPM (min⁻¹). Replace spring/shoes as required, check idle speed. Inspect and re-tighten holders securely.
Excessive vibration.	<ul style="list-style-type: none"> Warped or damaged cutting attachment. Loose gearcase. Bent main shaft/worn or damaged bushings. 	<ul style="list-style-type: none"> Inspect and replace attachment as required. Tighten gearcase securely. Inspect and replace as necessary.
Cutting attachment will not rotate.	<ul style="list-style-type: none"> Shaft not installed in powerhead or gearcase. Broken shaft. Damaged gearcase. 	<ul style="list-style-type: none"> Inspect and reinstall as required. Consult with an authorized servicing dealer.

The following statement only applies to United States and its territories

Shindaiwa Corporation Federal Emission Design And Defect Limited Warranty Utility And Lawn And Garden Engines

Shindaiwa Corporation warrants to the initial purchaser and each subsequent owner, that this utility equipment engine (herein engine) is designed, built and equipped to conform at the time of initial sale, to all applicable regulations of the U.S. Environmental Protection Agency (EPA), and that the engine is free of defects in materials and workmanship that would cause this engine to fail to conform with EPA regulations during its warranty period. This emission warranty is applicable in all States, except the State of California.

For parts listed under PARTS COVERED, the dealer authorized by Shindaiwa Corporation will, at no cost to you, make the necessary diagnosis, repair, or replacement of any defective emission-related component to ensure that the engine complies with applicable U.S. EPA regulations.

MANUFACTURERS WARRANTY COVERAGE

When sold within the U.S., this engine's emission control system is warranted for a period of two (2) years from the date this product is first delivered to the original retail purchaser.

OWNER'S WARRANTY RESPONSIBILITIES

As the engine owner, you are responsible for the performance of the required maintenance listed in your owner's manual. Shindaiwa Corporation recommends that you retain all receipts covering maintenance on your engine, but Shindaiwa Corporation cannot deny a warranty claim solely for the lack of receipts or for your failure to ensure the performance of all scheduled maintenance.

As the engine owner, you should however be aware that Shindaiwa Corporation may deny your warranty coverage if your engine or a part has failed due to abuse, neglect, improper maintenance or unapproved modifications.

You are responsible for presenting your engine to the nearest dealer authorized by Shindaiwa Corporation when a problem exists.

If your Shindaiwa Dealer is unable to answer questions regarding your warranty rights and responsibilities, you should then contact your Shindaiwa Distributor.

For the name and telephone number of the Shindaiwa Distributor in your area, please call Shindaiwa Inc. at (503) 692-3070 between the hours of 8:00 AM and 5:00 PM Pacific Standard Time.

PARTS COVERED

Listed below are the parts covered by the Federal Emission Design and Defect Warranty. Some parts listed below may require scheduled maintenance and are warranted up to the first scheduled replacement of that part. The warranted parts include:

1. Carburetor Internal Components
 - Valve Assembly-throttle, Jet, Metering Diaphragm
2. Ignition System Components
 - Ignition Coil
 - Flywheel Rotor

The emission control system for your particular Shindaiwa engine may also include certain related hoses and connectors.

LIMITATIONS

The Federal Emission Design and Defect Warranty shall not cover any of the following:

- (a) conditions resulting from tampering, misuse, improper adjustment (unless they were made by the dealer or service center authorized by Shindaiwa Corporation during a warranty repair), alteration, accident, failure to use the recommended fuel and oil, or not performing required maintenance services,

- (b) the replacement parts used for required maintenance services,
- (c) consequential parts used for required maintenance services,
- (d) diagnosis and inspection fees that do not result in eligible warranty service being performed, and
- (e) any non-authorized replacement part, or malfunction of authorized parts due to use of non-authorized parts.

MAINTENANCE AND REPAIR REQUIREMENTS

You are responsible for the proper use and maintenance of the engine. You should keep all receipts and maintenance records covering the performance of regular maintenance in the event questions arise. These receipts and maintenance records should be transferred to each subsequent owner of the engine. Shindaiwa Corporation reserves the right to deny warranty coverage if the owner has not properly maintained the engine. Shindaiwa Corporation will not deny warranty repairs, however, solely because of the lack of repair, maintenance or failure to keep maintenance records.

MAINTENANCE, REPLACEMENT OR REPAIR OF EMISSION CONTROL DEVICES AND SYSTEMS MAY BE PERFORMED BY ANY REPAIR ESTABLISHMENT OR INDIVIDUAL; HOWEVER, WARRANTY REPAIRS MUST BE PERFORMED BY A DEALER OR SERVICE CENTER AUTHORIZED BY SHINDAIWA CORPORATION THE USE OF PARTS THAT ARE NOT EQUIVALENT IN PERFORMANCE AND DURABILITY TO AUTHORIZED PARTS MAY IMPAIR THE EFFECTIVENESS OF THE EMISSION CONTROL SYSTEM AND MAY HAVE A BEARING ON THE OUTCOME OF A WARRANTY CLAIM.

If other than the parts authorized by Shindaiwa Corporation are used for maintenance replacements or for the repair of components affecting emission control, you should assure yourself that such parts are warranted by their manufacturer to be equivalent to the parts authorized by Shindaiwa Corporation in their performance and durability.

OBTAINING WARRANTY SERVICE

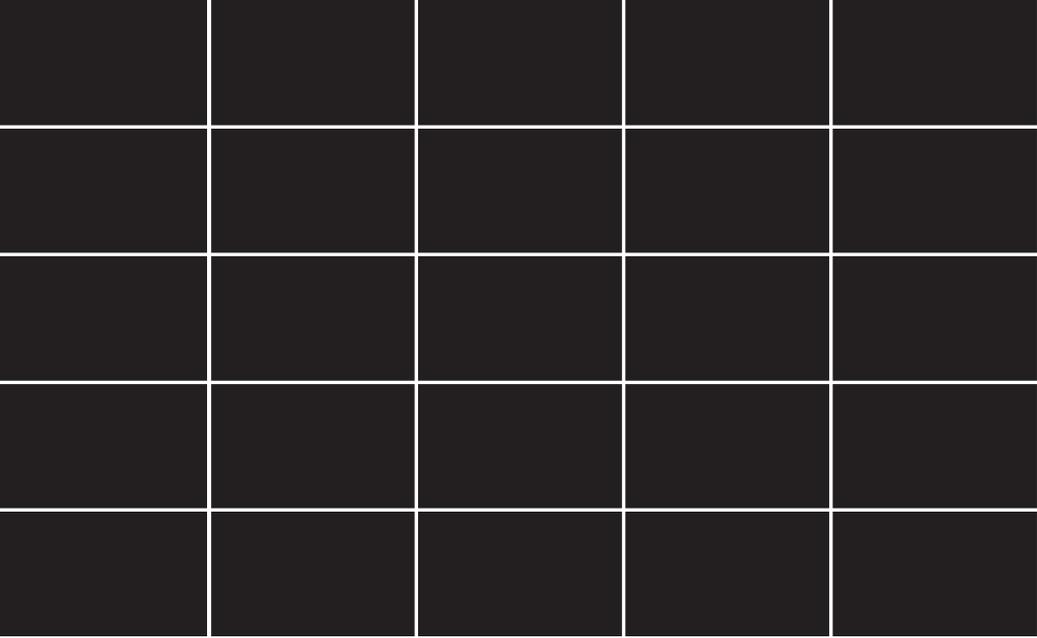
All repairs qualifying under this limited warranty must be performed by a dealer authorized by Shindaiwa Corporation

If any emission-related part is found defective during the warranty period, it is your responsibility to present the product to an authorized Shindaiwa dealer. Bring your sales receipts showing the date of purchase for this engine. The dealer authorized by Shindaiwa Corporation will perform the necessary repairs or adjustments within a reasonable amount of time and furnish you with a copy of the repair order. All parts and accessories replaced under this warranty become the property of Shindaiwa Corporation.

To locate an authorized Shindaiwa dealer near you, contact your Shindaiwa Distributor. For the name and telephone number of the Shindaiwa Distributor in your area, please call Shindaiwa Inc. at (503) 692-3070 between the hours of 8:00 AM and 5:00 PM Pacific Standard Time.

THIS WARRANTY IS ADMINISTERED BY

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