

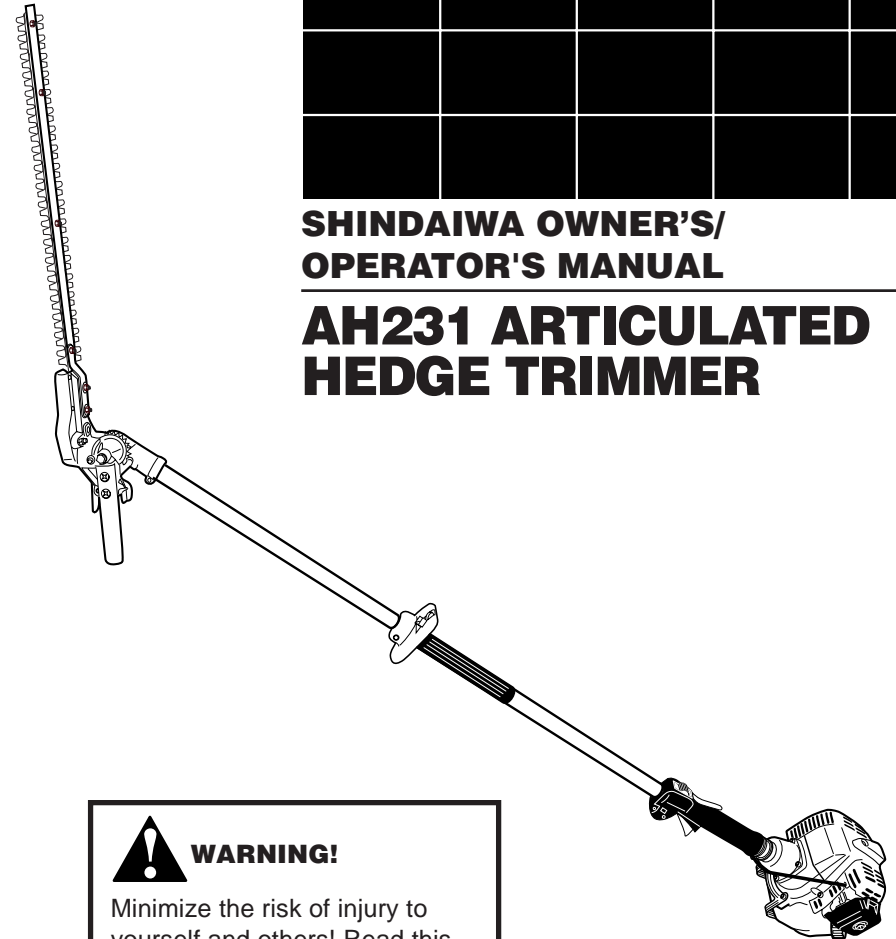
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SHINDAIWA OWNER'S/ OPERATOR'S MANUAL

AH231 ARTICULATED HEDGE TRIMMER



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 63848-94010
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Attention Statements

Throughout this manual are special attention statements.



DANGER!

A statement preceded by the triangular attention symbol and the word "DANGER" indicates an imminently hazardous situation which, if not avoided, WILL result in death or serious injury!



WARNING!

A statement preceded by the triangular attention symbol and the word "WARNING" indicates a potentially hazardous situation which, if not avoided, COULD result in death or serious injury.

CAUTION!

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

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.

Introduction

The Shindaiwa AH231 Articulated Hedge Trimmer is 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 these instructions describes units available at the time of publication. While every attempt has been made to provide the latest information about your Shindaiwa product, there may be some differences between your AH231 and what is described here. Shindaiwa Inc. reserves the right to make changes to products without prior notice and without obligation to make alterations to units previously manufactured.

The procedures described in this manual are intended to help you get the most from your 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 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.

Safety Precautions



DANGER!



THE ARTICULATED HEDGE TRIMMER IS NOT INSULATED AGAINST ELECTRICAL SHOCK!

Approaching or contacting electrical lines with the trimmer could cause death or serious injury. Keep the trimmer at least 33 feet (10 meters) away from electrical lines or branches that contact electrical lines.



WARNING!

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

An articulated hedge trimmer has the potential to do serious damage if misused, abused or mishandled. To reduce the risk of injury, you must maintain control at all times, and observe all safety precautions during operation. Never permit a person without training or instruction to operate this trimmer!

Safety Precautions



Read and follow this manual, make sure anyone using the trimmer does likewise. Failure to do so could result in serious personal injury or machine failure. Keep this manual for future reference



Always wear a hard hat to reduce the risk of head injuries during operation of this machine. In addition, always wear eye and hearing protection. Shindaiwa recommends wearing a face shield as additional face and eye protection. Wear non-slip heavy-duty gloves to improve your grip on the trimmer handle. Wear sturdy footwear with nonslip soles to provide good footing. Steel-toed safety boots are recommended. Wear snug-fitting clothes that also permit freedom of movement.



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



Electrical Hazard



Keep bystanders at least 50 feet (15 meters) away from the operating trimmer to reduce the risk of being struck by falling objects or thrown debris.



Danger Falling Debris

Owners Warranty Responsibilities

As the small off-road engine owner, you are responsible for the performance of the required maintenance listed in this owners manual. Shindaiwa Kogyo Co., Ltd. recommends that you retain all receipts covering maintenance on your small off-road engine, but Shindaiwa Kogyo Co., Ltd. cannot deny warranty solely for the lack of receipts or for your failure to ensure the performance of all scheduled maintenance.

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

You are responsible for presenting your small off-road engine to an authorized Shindaiwa Dealer as soon as a problem exists. The warranty repairs should be completed in a reasonable amount of time, not to exceed 30 days.

If you have any questions regarding your warranty rights and responsibilities, you should contact a Shindaiwa customer service representative at (503) 692-3070 or your local Shindaiwa Dealer.

Consequential Damages

In the event that other component parts of this product are damaged by the failure of a warranted part, Shindaiwa Kogyo Co., Ltd. will repair or replace such component parts at no charge to you.

What is Not Covered

- Failures caused by abuse, neglect, or improper maintenance procedures.
- Failures caused by the use of modified or non-approved parts or attachments.

This Warranty is Administered by:

Shindaiwa Inc.
11975 S.W. Herman Rd.
Tualatin, OR 97062
(503) 692-3070

Emission System Warranty Statement

Your Warranty Rights and Obligations

The California Air Resources Board, the U.S. Environmental Protection Agency and Shindaiwa Kogyo Co., Ltd. are pleased to explain the emission control system warranty on your new small off-road (non-road) engine.

In California, new small off-road engines must be designed, built, and equipped to meet the State's stringent anti-smog standards. In other states, new 1997 and later non-road engines must meet the Federal EPA's stringent anti-smog standards. Shindaiwa Kogyo Co., Ltd. must warrant the emission control system on your small off-road engine for the periods of time listed below, provided there has been no abuse, neglect, or improper maintenance of your small off-road engine.

Your engine emission control system includes parts such as the carburetor, the ignition system and, if equipped, the catalytic converter. These components are specifically listed below.

Where a warrantable condition exists, Shindaiwa Kogyo Co., Ltd. will repair your small off-road engine at no cost to you including diagnosis, parts, and labor.

Manufacturer's 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.

During the warranty period, Shindaiwa Kogyo Co., Ltd. will, at their option, repair or replace any defective emission-related component on this engine. During the original Warranty Period, these Warranty Rights are automatically transferable to subsequent owners of this product.

What is Covered by this Warranty

1. Carburetor Internal Components
 - Throttle Valve, Needle, Jet, Metering Diaphragm
2. Ignition System Components
 - Ignition Coil
 - Flywheel Rotor
3. Catalytic Converter (if originally equipped)

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

Safety Equipment and Labels

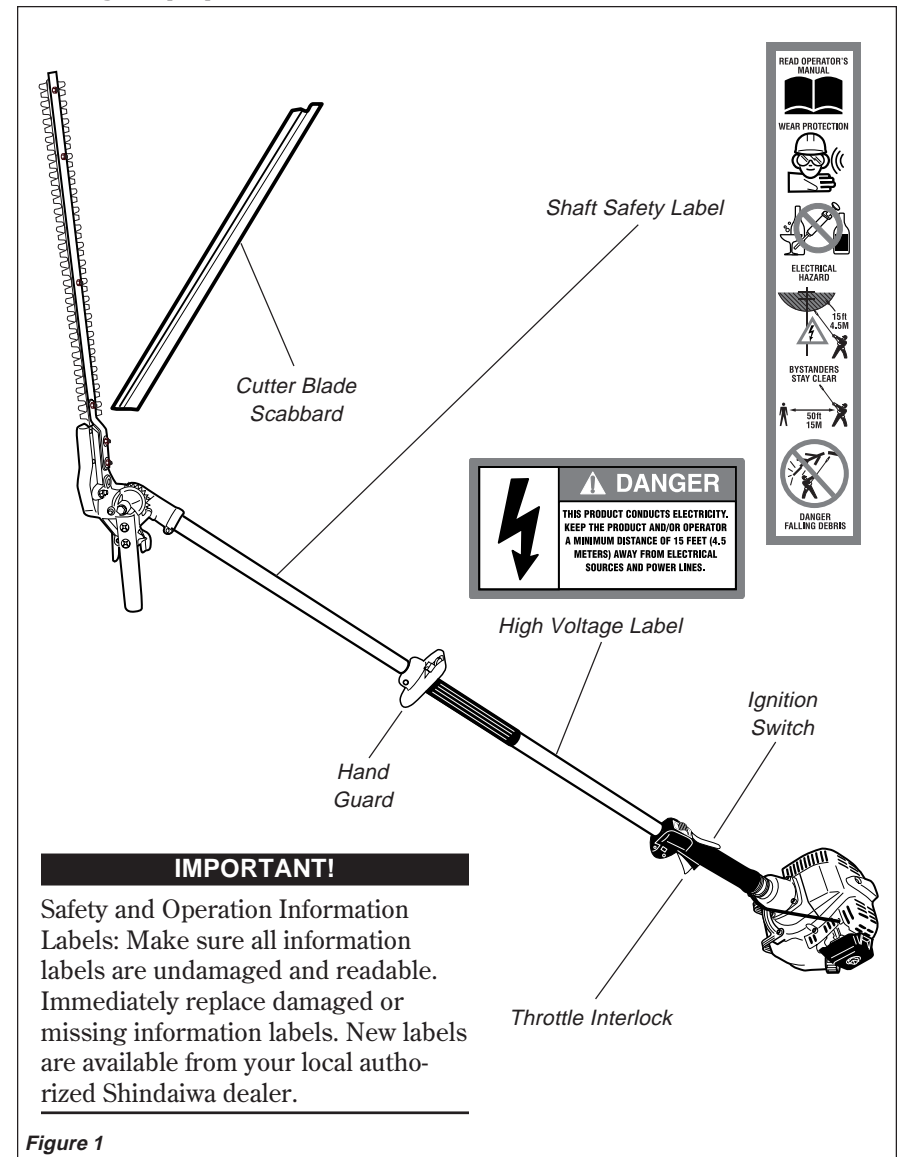


Figure 1

Operating Precautions



WARNING! Use Good Judgement

- Always make sure the cutter attachment is properly installed and firmly tightened before operation.
- Never use a cracked or warped cutter or cutter bar: replace it with a serviceable one and make sure it fits properly.
- Before starting the engine, make sure the cutter is not contacting anything.
- 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.
- When cutting a branch that is under tension, be alert for spring-back so that you will not be struck by the moving branch.
- Stop the unit immediately if it suddenly begins to vibrate or shake. Inspect for broken, missing or improperly installed parts or attachments.
- Do not operate the articulated hedge trimmer with the muffler removed.
- Make sure there is always good ventilation when operating the articulated hedge trimmer. Fumes from engine exhaust can cause serious injury or death. Never run the engine indoors!
- Make sure there are no missing or loose fasteners, and that the stop switch and throttle controls are working properly.
- If a cutter should bind fast in a cut, shut off the engine immediately. Push the branch or tree to ease the bind and free the cutter.
- Make sure the cutters are correctly adjusted before operating the articulated hedge trimmer (see page 24 for cutter adjustment procedures). Never attempt cutter adjustment with the engine running!



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** move the unit to a place well away from a fuel storage area or other readily flammable materials before starting the engine.
- **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.
- **NEVER** place flammable material close to the engine muffler.
- **NEVER** run the engine without the spark arrester screen in place.

Troubleshooting Guide (continued)

ADDITIONAL PROBLEMS

Symptom	Possible Cause	Remedy
Excessive vibration.	Warped or damaged attachment.	Inspect and replace attachment as required.
	Loose gearcase.	Tighten gearcase securely.
	Bent main shaft/worn or damaged bushings.	Inspect and replace as necessary.
Cutter will not rotate.	Shaft not installed in powerhead or gearcase.	Inspect and reinstall as required.
	Broken shaft.	Consult your servicing dealer.
	Damaged gearcase.	Consult your servicing dealer.

Troubleshooting Guide (continued)

ADDITIONAL PROBLEMS

Symptom	Possible Cause	Remedy
Poor acceleration.	Clogged air cleaner element.	Clean the air cleaner element.
	Clogged fuel filter.	Replace the fuel filter.
	Carburetor mixture too lean.	Consult with an authorized servicing dealer.
	Idle speed set too low.	Adjust: 2,750 (\pm 250) rpm (min^{-1})
Engine stops abruptly.	Switch turned off.	Reset the switch and re-start.
	Fuel tank empty.	Refuel.
	Clogged fuel filter.	Replace filter.
	Water in the fuel.	Drain and refill with fresh, clean unleaded gasoline with a pump octane of 87 or higher mixed with a 2-cycle air cooled mixing oil that meets or exceeds ISO-L-EGD and/or JASO FC classified oils at 50:1 gasoline/oil ratio.
	Shorted spark plug or loose terminal.	Clean and replace spark plug, tighten the terminal.
	Ignition failure. Piston seizure.	Consult with an authorized servicing dealer. Consult with an authorized servicing dealer.
Engine difficult to shut off.	Ground (stop) wire is disconnected, or switch is defective.	Test and replace as required.
	Overheating due to incorrect spark plug.	Replace the spark plug with a Champion CJ8 or equivalent spark plug of the correct heat range. Adjust the spark plug electrode gap to 0.024-inch (0.6 mm).
	Overheated engine.	Idle engine until cool. Refer to page 20 (overheated engine).
Cutting attachment moves at engine idle.	Engine idle too high.	Set idle: 2,750 (\pm 250) rpm (min^{-1})
	Broken clutch spring or worn clutch spring boss.	Replace spring/shoes as required, check idle speed.
	Loose attachment holder.	Inspect and re-tighten holder securely.



WARNING!

- Never transport the articulated hedge trimmer nor set it down with the engine running. An engine that's running could be accidentally accelerated causing the blades to oscillate.
- Make sure the cover is in place when transporting the articulated hedge trimmer.
- When carrying the articulated hedge trimmer by hand, the cutter attachment should be pointing backward with the cutter blade in the retracted or transporting position (see page 13 for articulating adjustment procedures). See Figure 2.

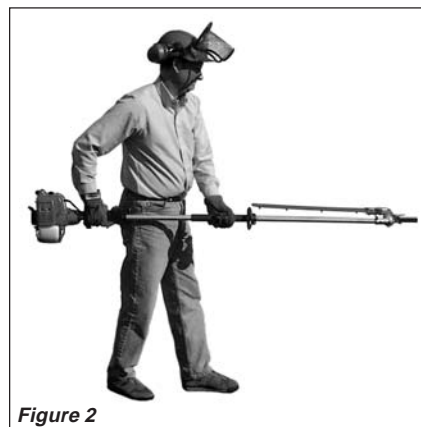


Figure 2

CAUTION!

- Always maintain the articulated hedge trimmer according to this owner's manual and follow the recommended scheduled maintenance.
- Never modify or disable any of the hedge trimmer's safety devices.
- Always use genuine Shindaiwa parts and accessories when repairing or maintaining this unit.
- Do not make unauthorized modifications to the articulated hedge trimmer.
- Never allow the engine to run at high RPM without a load. Doing so could damage the engine.
- When transporting the hedge trimmer in a vehicle, tie it down securely to prevent fuel spillage or damage to the unit.
- Always clear your work area of trash or hidden debris to help ensure good footing.
- Keep the cutters sharp and properly adjusted.
- Keep the articulated hedge trimmer as clean as possible. Keep it free of loose vegetation, mud, etc.

Operating the Articulated Hedge Trimmer

Always wear a hard hat to reduce the risk of head injuries during operation of this unit.

Secure long hair so it is above shoulder level.

Wear non-slip heavy-duty gloves to improve your grip on the trimmer handle. Wear snug-fitting clothes that also permit freedom of movement. NEVER wear shorts!



Always wear eye and hearing protection. Shindaiwa recommends wearing a face shield as additional face and eye protection.

Always operate with both hands firmly gripping the unit.

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



Keep bystanders at least 50 feet (15 meters) away from the operating trimmer to reduce the risk of being struck by falling objects or thrown debris.

Wear sturdy footwear with nonslip soles to provide good footing. Steel-toed safety boots are recommended. Never operate unit bare-footed.

Figure 3

Troubleshooting Guide (continued)

LOW POWER OUTPUT		
What To Check	Possible Cause	Remedy
Is the engine overheating?	Operator is overworking the machine.	Shorten trimmer line. Cut at a slower rate.
	Carburetor mixture is too lean.	Consult with an authorized servicing dealer.
	Improper fuel ratio.	Refill with fresh, clean unleaded gasoline with a pump octane of 87 or higher mixed with a 2-cycle air cooled mixing oil that meets or exceeds ISO-L-EGD and/or JASO FC classified oils at 50:1 gasoline/oil ratio.
	Fan, fan cover, cylinder fins dirty or damaged.	Clean, repair or replace as necessary.
Engine is rough at all speeds. May also have black smoke and/or unburned fuel at the exhaust.	Carbon deposits on the piston or in the muffler.	Consult with an authorized servicing dealer.
	Clogged air cleaner element.	Service the air cleaner.
	Loose or damaged spark plug.	Tighten or replace. Replace the spark plug with a Champion CJ8 or equivalent spark plug of the correct heat range. Adjust the spark plug electrode gap to 0.024-inch (0.6 mm).
	Air leakage or clogged fuel line.	Repair or replace fuel filter and/or fuel line.
	Water in the fuel.	Refill with fresh, clean unleaded gasoline with a pump octane of 87 or higher mixed with a 2-cycle air cooled mixing oil that meets or exceeds ISO-L-EGD and/or JASO FC classified oils at 50:1 gasoline/oil ratio.
	Piston seizure.	Consult with an authorized servicing dealer.
	Faulty carburetor and/or diaphragm.	Consult with an authorized servicing dealer.
Engine is knocking.	Overheating condition.	See above.
	Improper fuel.	Check fuel octane rating; check for presence of alcohol in the fuel (pg. 15). Refuel as necessary.
	Carbon deposits in the combustion chamber.	Consult with an authorized servicing dealer.

Troubleshooting Guide

ENGINE DOES NOT START

What To Check	Possible Cause	Remedy
Does the engine crank?	NO → Faulty recoil starter. Fluid in the crankcase. Internal damage.	Consult with an authorized servicing dealer.
YES ↓		
Good compression?	NO → Loose spark plug. Excess wear on cylinder, piston, rings.	Tighten and re-test. Consult with an authorized servicing dealer.
YES ↓		
Does the tank contain fresh fuel of the proper grade?	NO → Fuel incorrect, stale, or contaminated; mixture incorrect.	Refill with fresh, clean unleaded gasoline with a pump octane of 87 or higher mixed with a 2-cycle air cooled mixing oil that meets or exceeds ISO-L-EGD and/or JASO FC classified oils at 50:1 gasoline/oil ratio
YES ↓		
Is fuel visible and moving in the return line when priming?	NO → Check for clogged fuel filter and/or vent.	Clean as required; restart.
YES ↓		
Is there spark at the spark plug wire terminal?	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.
YES ↓		
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 spark plug, and re-start. Clean and re-gap the spark plug to 0.024 inch (0.6 mm). Re-start. Replace the spark plug with a Champion CJ8 or equivalent spark plug of the correct heat range. Adjust the spark plug electrode gap to 0.024-inch (0.6 mm).

AH231 Specifications

Dry Weight	5.9 kg/13.0 lb.	Muffler Type	2-Stage Catalyst
Length (storage or transporting position)	2360mm/93.0 in.	Starting Method	Recoil
Engine Type	2-cycle, air-cooled, vertical-cylinder	Cooling System	Forced air
Bore x Stroke	32 x 28 mm/1.3 x 1.1"	Stopping Method	Slide switch
Displacement	22.5 cc/1.4 cu. in.	Transmission Type	Automatic, centrifugal clutch with bevel gear
Maximum Output	1.1 hp/0.8kW @ 7500 rpm (min ⁻¹)	Blade Length	567 mm/22.3 in.
Fuel/oil ratio	50:1 with ISO-L-EGD or JASO FC class 2-cycle Mixing Oil <i>Shindaiwa ONE is a registered JASO FC classified oil and also meets or exceeds ISO-L-EGD performance requirements.</i>	Cutter Drive	Spur gear
Fuel Tank Capacity	670 cc/22.7 oz.	Gear Lubricant ..	Lithium-based grease
Carburetor Type	Walbro WYL diaphragm type	Standard Equipment	Tool kit containing a spark plug wrench, 4mm hex wrench, and 8 x 10mm spanner
Ignition	One-piece, electronic, transistor-controlled	Optional Equipment	Harness and bracket
Spark Plug	EPA version	EPA Emission Compliance Period*	Category A
Air Filter	Nonreversible flocked filter element	* The EPA emission compliance referred to on the emission compliance label located on the engine, indicates the number of operating hours for which the engine has been shown to meet Federal emission requirements. Category C = 50 hours (Moderate), B = 125 hours (Intermediate) and A = 300 hours (Extended).	

Specifications are subject to change without notice.

Product Description

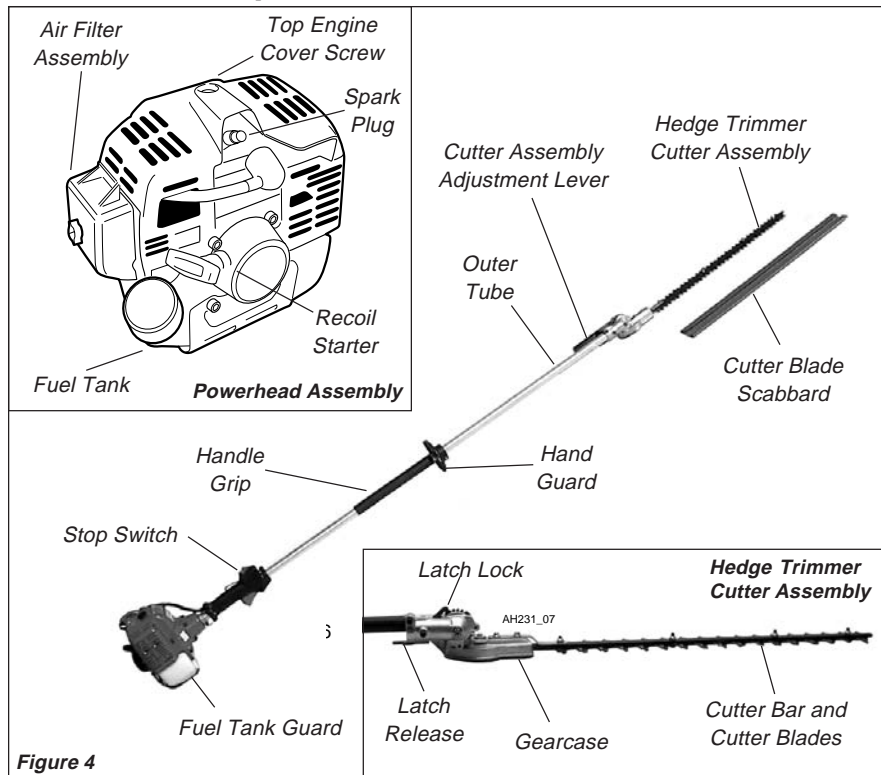


Figure 4

Prior To Assembly

Using Figure 4 as a guide, familiarize yourself with the Shindaiwa AH231 articulated hedge trimmer and its various components. Understanding your unit helps ensure top performance, longer service life, and safer operation.

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

- Engine assembly
- Outer tube/cutter assembly
- Kit with this manual and tool kit for routine maintenance.
- Cutter blade scabbard

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.



WARNING!

Do not make unauthorized modifications or alterations to your articulated hedge trimmer or its components.

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 and apply a light coating of oil to all metal surfaces.
- Drain all the fuel from the fuel tank.

IMPORTANT!

All stored fuels should be stabilized with a fuel stabilizer such as STA-BIL™, if **ONE** oil with fuel stabilizer is not used.

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 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 unit in a clean, dust-free area.

Cutter Blade Adjustment



WARNING!

The cutter blades are very sharp! Always wear gloves when working around the cutter assembly.

CAUTION!

Operating the trimmer with worn or improperly adjusted cutters will reduce cutter performance and may also damage your unit.

Cutter performance of your unit depends in great measure on cutter blade clearance. Properly adjusted blades will oscillate freely yet help prevent binding of cut material between blades. Adjust blades as follows (Figure 32):

1. Loosen all blade locknuts at least one full turn.
2. Tighten each blade shoulder bolt firmly, and then loosen the shoulder bolts 1/4 to 1/2 turn.
3. Working from the gearcase end, lock each bolt in place by firmly tightening its locknut while preventing the shoulder bolt from turning.

When shoulder bolt adjustment is correct, there should be a gap of 0.25–0.50 mm between the cutter blades and the flat washers, and the flat washer beneath each bolt head should turn freely.

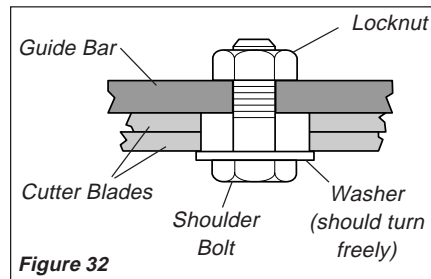


Figure 32

Powerhead Installation

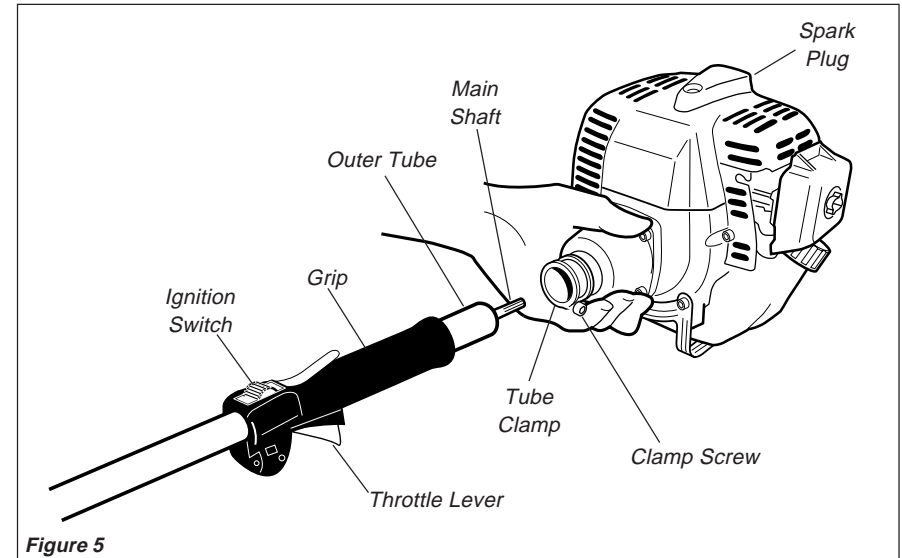


Figure 5

Connect the Outer Tube to the Powerhead.

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

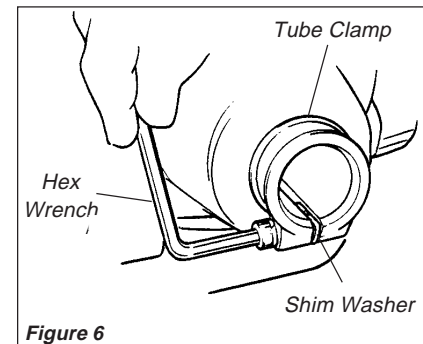


Figure 6

the tube clamp screw. Verify that the D-shaped shim washer is positioned as shown in Figure 6.

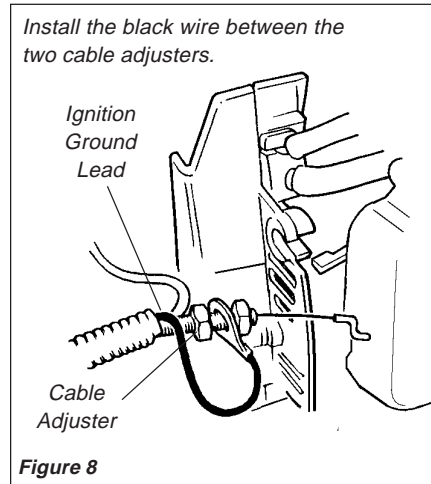
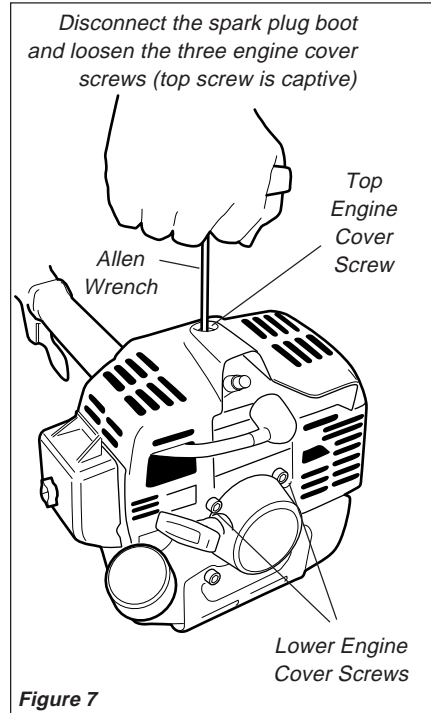
CAUTION!

Do not remove the D-shaped shim washer! The shim washer prevents damage from overtightening the tube clamp screw.

CAUTION!

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

Assembly: AH231

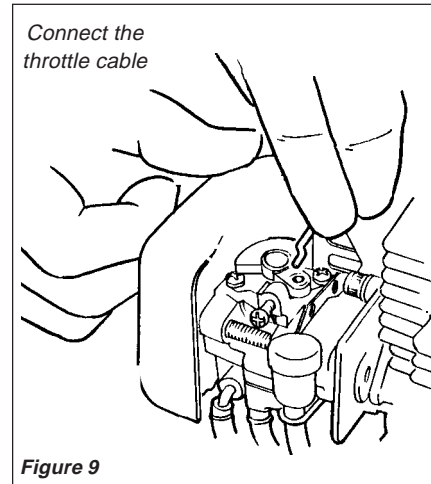


Connect the Throttle Cable.

1. Loop the ribbed cable tube to the top left side of the engine.
2. Install the black wire between the two cable adjuster nuts as shown in Figure 8.

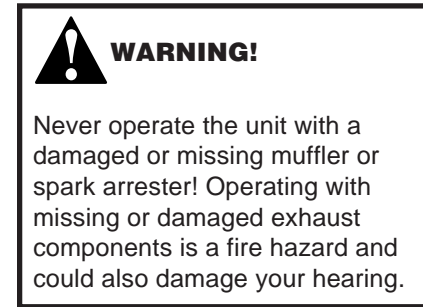
Remove the Cylinder Cover.

1. Remove the spark plug boot.
2. Loosen the three cylinder cover screws, and then lift off the cylinder cover.



135-hour Maintenance

Every 135 hours of operation, remove and clean the muffler.

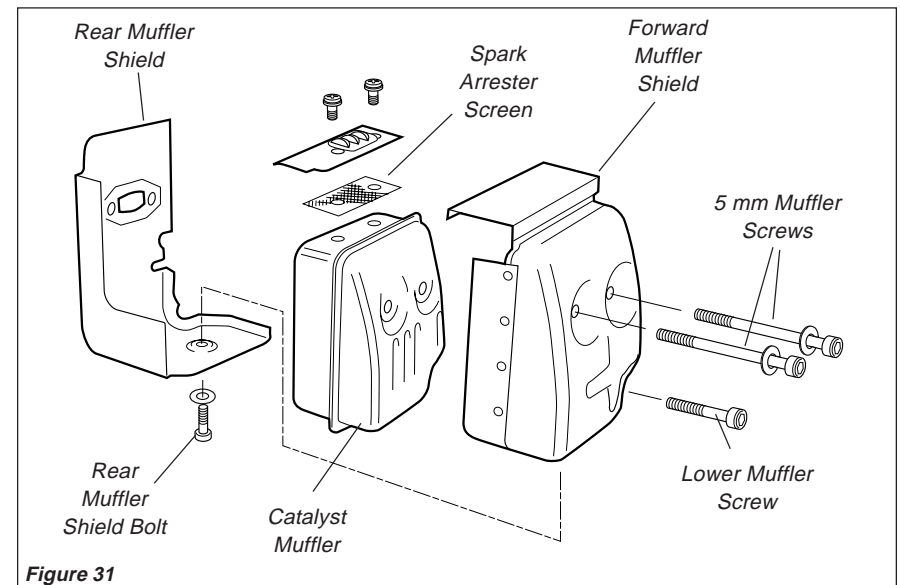


1. Remove the spark plug boot.
2. Loosen the two 4 mm engine cover screws (located at the top of the recoil housing).
3. Loosen the 5 mm engine top cover screw (the screw is captive) and lift the cover from the engine.

4. Remove the two 5 mm muffler screws. Remove the lower muffler screw, then lift the muffler assembly from the engine.
5. Remove the rear muffler shield bolt and, while noting the orientation of parts, separate the muffler shield.
6. Remove the spark arrester screen and clean with a stiff bristle brush.
7. Gently tap the muffler on a wood surface to dislodge any loose carbon.
8. Inspect the cylinder exhaust port for carbon buildup.
9. Reassemble the muffler in the reverse order of disassembly.

IMPORTANT!

If you note excessive carbon buildup, consult your servicing dealer.



50-Hour Maintenance

Every 50 hours of operation

(more frequently in dusty or dirty conditions):

- Remove and clean the cylinder cover and clean dirt and debris from the cylinder cooling fins.
- **Lubricate the gearcase.** To perform this operation, first remove the gearcase from the outer tube as follows (Figure 28.):

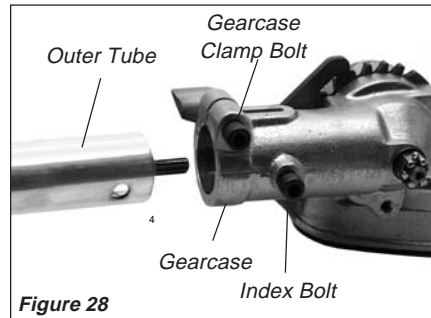


Figure 28

CAUTION!

Do not remove the D-shaped shim washer from the gearcase clamp! The shim washer prevents damage from overtightening the tube clamp screw.

- Loosen the gearcase clamp bolt.
- Remove the index bolt from the gearcase.
- Slide the gearcase out of the tube.

Using a grease gun, pump lithium-base grease (about 10 grams) into the grease fitting on the gearcase until you see old grease being purged from the gearcase (Figure 29). Purged grease will be visible in the outer tube cavity. Clean up excess grease, then reassemble the gearcase onto the outer tube. Make sure the index bolt fits into the hole on the outer tube. Securely tighten both bolts.

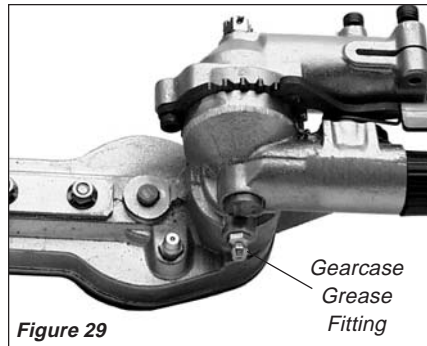


Figure 29

Servicing the fuel filter

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.

- Use a hooked wire to extract the fuel filter from inside the fuel tank (Figure 30). Inspect the fuel filter element. If it shows signs of contamination from debris, replace it with a genuine Shindaiwa replacement fuel filter element. Before reinstalling the filter, inspect the fuel line. If you discover damage or deterioration, the unit should be removed from service until it can be inspected by a Shindaiwa-trained service technician.

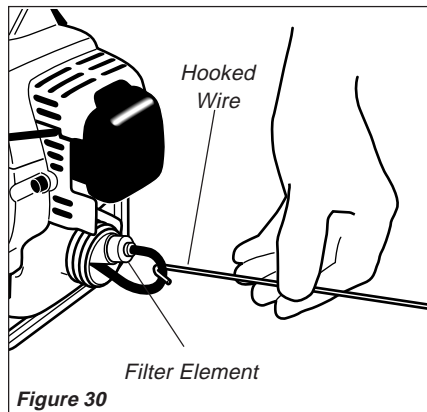


Figure 30

Assembly; AH231

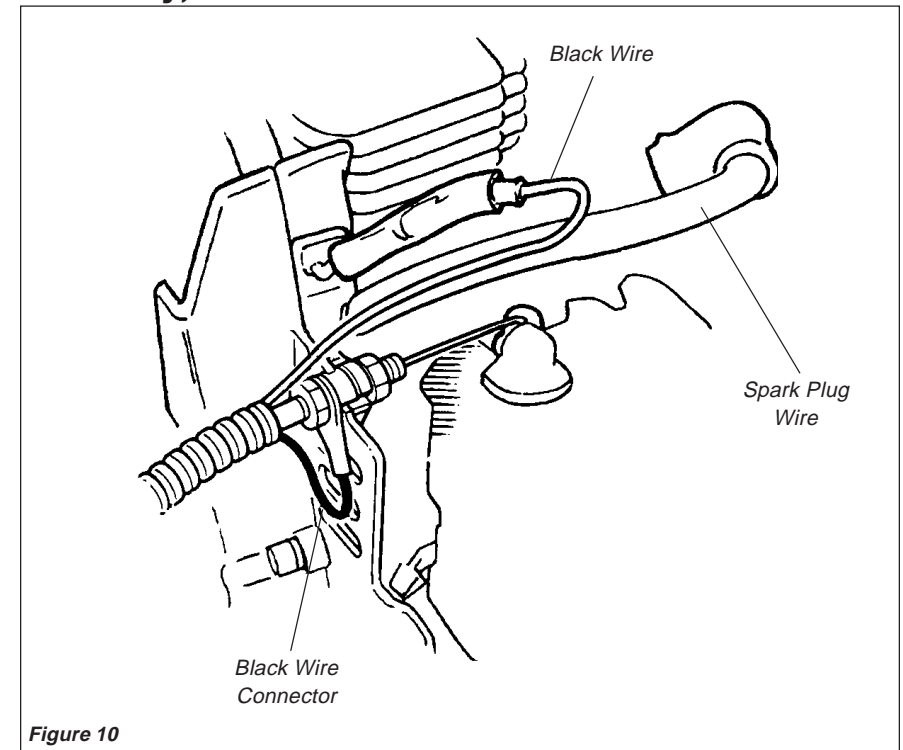


Figure 10

Assemble and Adjust the Throttle Cable.

1. Insert the throttle-cable housing into the notch on the fan cover, and clamp the black wire's connector between the fan cover and the cable outer adjuster nut as shown.
2. Tighten the two throttle cable adjuster nuts.
3. Using finger pressure only, connect the black switch 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 over the spark plug wire.

IMPORTANT!

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

4. Reinstall the cylinder cover and tighten the three cover screws.
5. Reinstall the spark plug boot.

CAUTION!

Wiring routing must not interfere with throttle operation.

Adjusting the Hedge Trimmer Cutter Assembly



WARNING!

- The cutter blades are very sharp. Do not grasp the blades with your hands. Do not brush the blades against your body.
- Never run the engine nor operate the articulated hedge trimmer when the cutter assembly is in the storage/transport position.

IMPORTANT!

Always use gloves when working near the cutter assembly.

Position the hedge trimmer on a flat, level surface with the engine resting on the fuel tank guard. Make sure the scabbard is in place on the blade.

1. With your right hand, grasp the handle, located immediately behind the hand guard. With your left hand, grip the adjustment lever on the cutter assembly. See Figure 11.

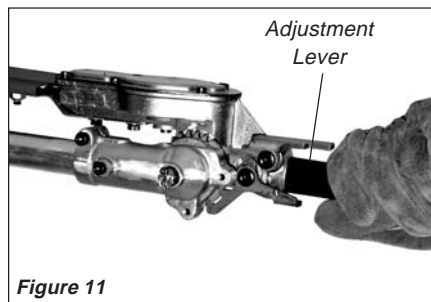


Figure 11

IMPORTANT!

The latch lock provides an interlock to help prevent inadvertent depression of the latch release.

2. With the index finger of your left hand, press the latch release. With your left thumb, press the latch lock. See Figure 12.

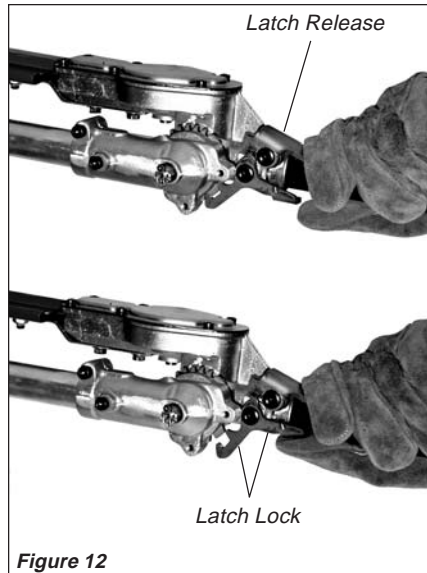


Figure 12

3. While holding the latch lock down, pivot the cutter assembly using the adjustment lever until it is straight with the outer tube (pivot 180°). See Figure 13.

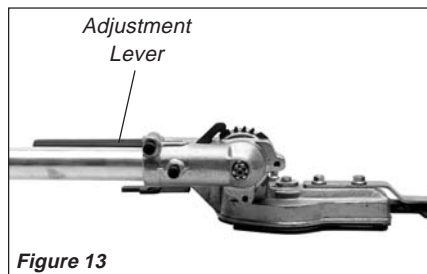


Figure 13

4. Release the latch lock and the latch release. Make sure the latch lock and the latch release return securely to a locking position.
5. Remove the scabbard from the cutter blade. The engine now may be started (refer to page 16 for procedures).

10-Hour Maintenance

CAUTION!

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

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

Remove the air cleaner element from the air cleaner housing and clean it thoroughly with soap and water. Let it dry before reinstalling the element. See Figure 25.

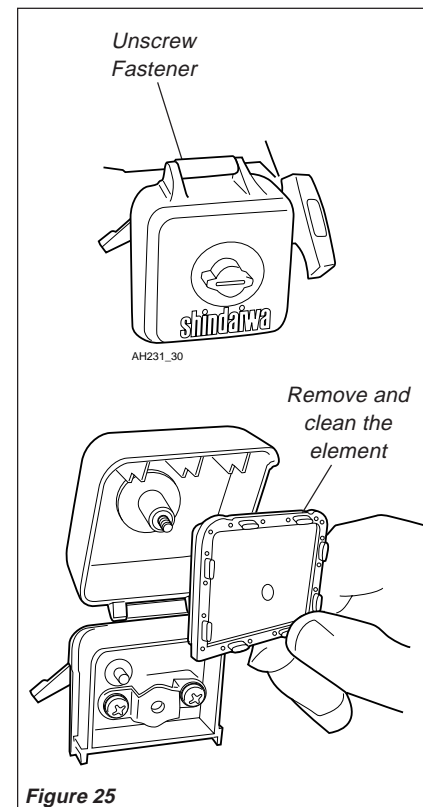


Figure 25

10/15-Hour Maintenance

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.

Every 10 to 15 hours of operation:

- Remove and clean the spark plug. See Figure 26. Adjust the spark plug electrode gap to 0.024-inch (0.6 mm). If the plug must be replaced, use only: Champion CJ8 or equivalent type spark plug of correct heat range.

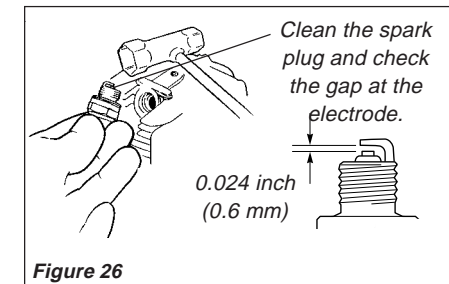


Figure 26

- Lubricate the cutter assembly gearbox by pumping one or two strokes of lithium-base grease into the grease fitting using a lever-type grease gun. See Figure 27.

CAUTION!

Overlubricating can cause the gearbox to operate sluggishly and can cause grease to leak out.

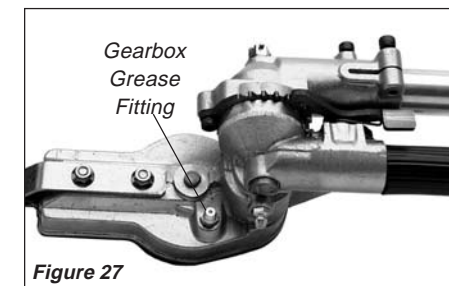
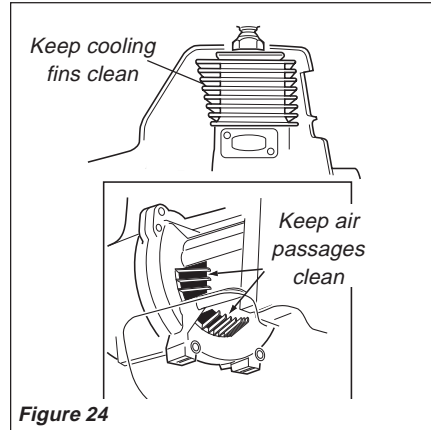


Figure 27

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. See Figure 24.



- Carefully remove any accumulations of dirt or debris from the muffler and fuel tank. Check cooling air intake area at base of crankcase. Remove all debris. Dirt build-up in these areas can lead to engine overheating, fire, or premature wear.

WARNING!

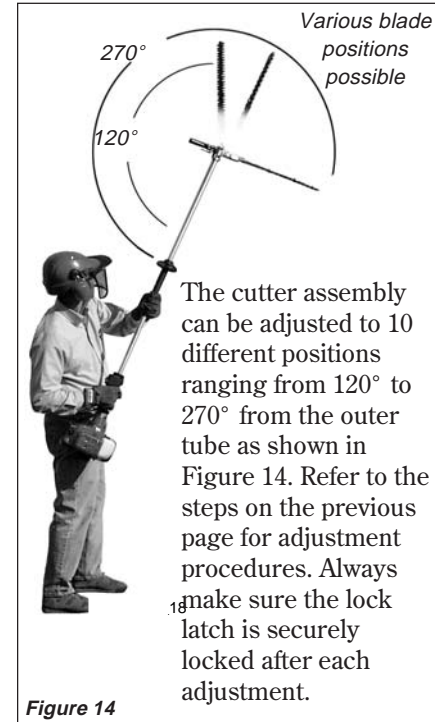
Always wear gloves when working around the cutter assembly.

- Clean any debris or dirt from the hedge trimmer cutter blades. Lubricate the blades before use and after refueling. Check the cutters for damage or incorrect adjustment.
- Check for loose or missing screws or components. Make sure the cutter attachment is securely fastened.
- Check the entire unit for leaking fuel or grease.
- Make sure nuts, bolts, and screws (except carburetor adjusting screws) are tight.

Adjusting the Hedge Trimmer Cutter Assembly for Desired Cutting Angles

WARNING!

Do not touch the cutter blades when the engine is running. The blades can oscillate even if the engine is idling.



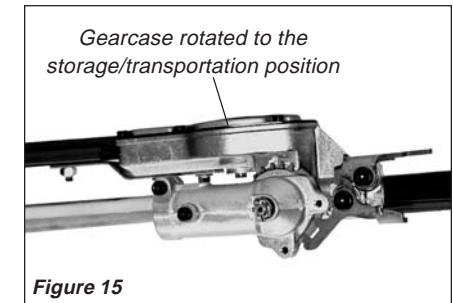
The cutter assembly can be adjusted to 10 different positions ranging from 120° to 270° from the outer tube as shown in Figure 14. Refer to the steps on the previous page for adjustment procedures. Always make sure the lock latch is securely locked after each adjustment.

Adjusting the Cutter Assembly for Storage or Transportation

WARNING!

Never run the engine when adjusting the cutter assembly to the storage position.

1. With the engine off, install the scabbard onto the blade.
2. Using the procedures described on the previous page, rotate the cutter assembly so it is parallel to the tube. Make sure the latch lock and the latch release return securely to a locking position. See Figure 15.
3. Make sure the scabbard is in place on the cutters before storing or transporting.



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 ISO-L-EGD or JASO FC class 2-cycle mixing oil only. Use of non-approved mixing oils in catalyst equipped units can lead to excessive carbon deposits.

- Use only fresh, clean unleaded gasoline with a pump octane of 87 or higher.
- Mix all fuel with a 2-cycle air-cooled mixing oil that meets or exceeds ISO-L-EGD and/or JASO FC classified oils at 50:1 gasoline/oil ratio.

Examples of 50:1 mixing quantities

- 1 gallon of gasoline to 2.6 oz. mixing oil
- 5 litres 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 **ONE** oil with fuel stabilizer is not used, it should first be treated with a fuel stabilizer such as StaBil™.



WARNING!

Minimize the risk of fire!

- Stop engine before refueling.
- Always allow the Articulated Hedge Trimmer to cool before refueling!
- Wipe all spilled fuel and move the Articulated Hedge Trimmer at least 10 feet (3 meters) from the fueling point 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 trimmer or fuel!
- Never place any flammable material near the engine muffler!
- Never operate the engine without the muffler and spark arrester in place and properly functioning!

Filling the Fuel Tank

1. Place the Articulated Hedge Trimmer 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 fuel tank with clean, fresh fuel mixture.
4. Install and firmly tighten the fuel cap.



Oil is a registered JASO FC classified oil and also meets or exceeds ISO-L-EGD performance requirements. Shindaiwa One is recommended for use in all Shindaiwa low emissions engines. Shindaiwa one also includes a fuel stabilizer.

General Maintenance

IMPORTANT!

MAINTENANCE, REPLACEMENT, OR REPAIR OF EMISSION CONTROL DEVICES AND SYSTEM MAY BE PERFORMED BY ANY REPAIR ESTABLISHMENT OR INDIVIDUAL. HOWEVER, WARRANTY REPAIRS MUST BE PERFORMED BY A DEALER OR SERVICE CENTER AUTHORIZED BY SHINDAIWA KOGYO, LTD. AND 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 THE 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.

IMPORTANT!

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

Muffler



WARNING!

Operating the engine without a muffler or with a muffler that is damaged or improperly installed can increase engine noise sufficiently to cause hearing loss.

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.

Adjusting The Carburetor



WARNING!

The cutter attachment must never oscillate at engine idle speed. If the idle speed cannot be adjusted by the procedures described here, return the trimmer to your Shindaiwa dealer for inspection.

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

Check and Adjust Idle Speed

1. Start the engine and allow it to idle two or three minutes, or until it warms up.
2. If the cutter attachment rotates at engine idle, reduce idle speed by turning the idle adjusting screw counter-clockwise as necessary. See Figure 23.

IMPORTANT!

Use a tachometer, if one is available, to set engine idle. Standard idle speed is: 2,750 (± 250) rpm (min^{-1}).

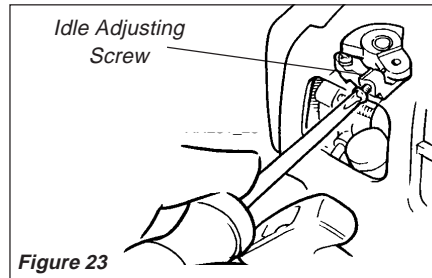


Figure 23

3. If the engine is stalling and won't idle, increase idle speed by turning the idle adjustment screw clockwise.

NOTE

This model is equipped with an EPA approved carburetor with no mixture adjustment.

Starting A Cold Engine – Restarting After Refueling

IMPORTANT!

Engine ignition is controlled by a two-position START-STOP switch mounted on the throttle body, typically labelled “I” for START and “O” for STOP.

1. Slide the ignition switch to the “I” (START) position. See Figure 16.

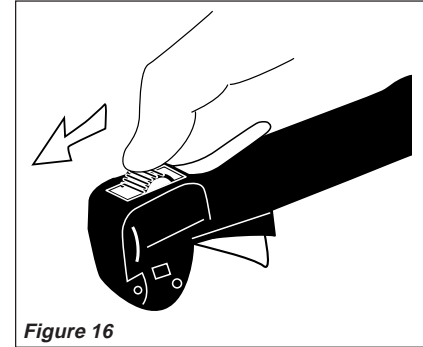


Figure 16

2. Prime the engine by depressing the carburetor primer bulb four or five times. See Figure 17. You should be able to see fuel inside the bulb.

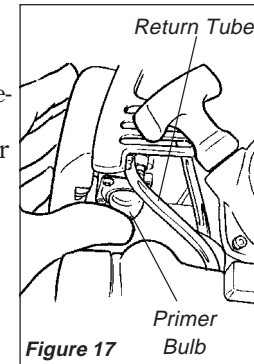


Figure 17

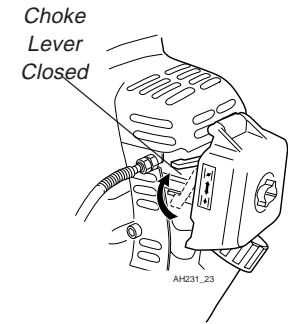


Figure 18

3. Choke the engine by moving the choke lever up to the “closed” position. See Figure 18.

Before starting the engine, make sure the cutter assembly is in the cutting position (extended). Refer to page 13 for adjustment procedures. Never start the engine with the cutter assembly in the storage/transportation position.

Control Positions (warm engine)

1. Slide the ignition switch to the “I” (START) position.
2. Move the choke lever down to the “open” position.

Cranking The Engine

WARNING!

When the engine starts or is running—even at idle—the hedge trimmer cutter blade may move (oscillate). Keep your hands and your body away from the cutter assembly while starting the engine!

WARNING!

When starting the engine, make sure the cutter attachment is well clear of bystanders, pets or objects. The cutter may oscillate during start-up.

CAUTION!

Never operate the trimmer unless a cutter attachment is installed.

Before starting the engine, make sure the cutter assembly is in the cutting position (extended). Refer to page 13 for adjustment procedures. Never start the engine with the cutter assembly in the storage/transportation position.

1. Place the unit firmly on the ground, making sure it is stable and that the cutter attachment is free and clear of any bystanders or objects. Grip the outer tube with your left hand and grasp the starter rope handle with your right hand. See Figure 19.



Figure 19

CAUTION!

The recoil starter can be damaged by abuse.

- Always engage the starter before attempting to crank the engine.
 - Never pull the starter cord to its full length.
 - Always rewind the starter cord slowly.
2. Pull the starter handle slowly until you feel the starter engage.
 3. Pull the starter handle quickly to start the engine.

When The Engine Starts Or Fires

Open the choke by moving the choke lever down. See Figure 20.

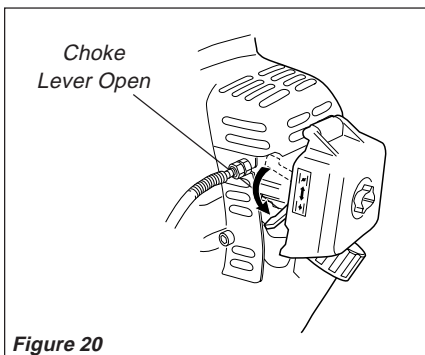


Figure 20

WARNING!

The cutter attachment will engage and oscillate as the engine starts and accelerates.

If the engine does not continue to run, repeat the appropriate cranking procedure (warm or cold engine).

When the engine starts, clear excess fuel from the combustion chamber by revving the engine several times with the throttle trigger.

If The Engine Fails To Start

Repeat the appropriate cranking procedure (warm or cold engine). If the engine fails to start after repeated attempts, the engine is likely flooded.

Starting A Flooded Engine

1. Disconnect the spark plug lead and use the spark plug wrench to remove the spark plug (turn counter clockwise to remove). See Figure 21.
2. Slide the ignition switch to the "O" (STOP) position.

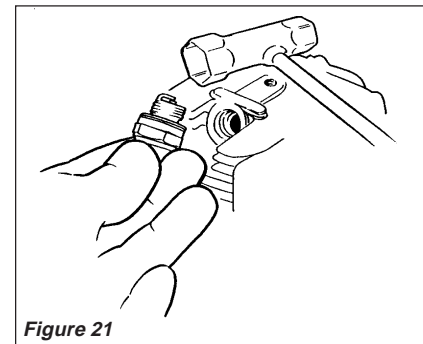


Figure 21

If the spark plug is fouled or soaked with fuel, clean the plug as necessary (for spark plug gapping specifications see page 21).

3. Open the choke (Figure 20) and fully depress the throttle lever with your left hand, then pull the starter handle rapidly with your right hand to clear excess fuel from the combustion chamber.

CAUTION!

Incorrect spark plug installation can result in serious engine damage.

4. Reinstall the spark plug and tighten it firmly. If a torque wrench is available, torque the spark plug to 148–165 in.-lb (170–190 kg/cm).
5. Repeat the starting procedure for a warm engine.
6. If the engine still fails to start, refer to the troubleshooting section near the end of this manual.

Stopping the Engine

WARNING!

The cutter attachment can continue moving after the engine is stopped!

1. Cool the engine by allowing it to idle for two or three minutes.
2. Slide the ignition switch to the "O" or STOP position. See Figure 22.

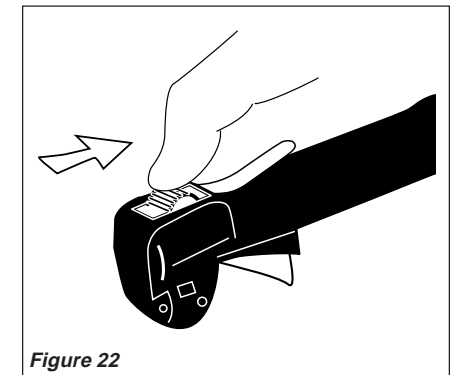


Figure 22

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