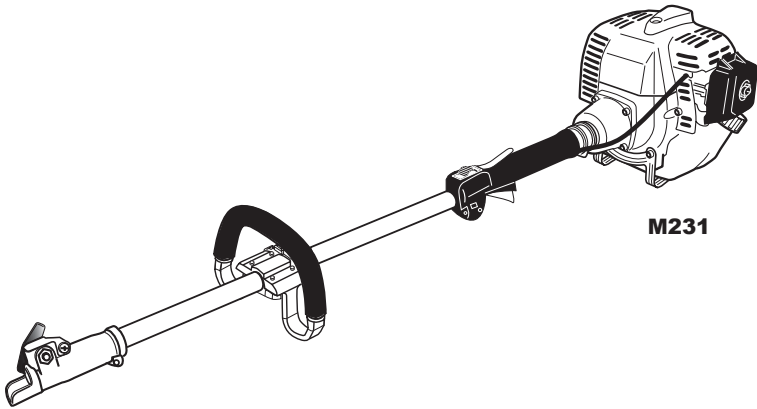


SHINDAIWA OWNER'S/OPERATOR'S MANUAL

M231 MULTIPURPOSE TOOL CARRIER



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.

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Part Number 65008-94011 Rev. 12/05

Introduction

The Shindaiwa 231-series of hand-held power tools has been designed and built to deliver superior performance and reliability without compromise to quality, comfort, safety or durability.

Shindaiwa engines represent the leading edge of high-performance 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.

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



WARNING!

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

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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.

IMPORTANT!

The operational 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 231-series 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.



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 heavy duty, non-slip gloves.



Safety tip shoes or boots with non-slip sole should be worn.



This product conducts electricity. Keep the product and/or operator a minimum distance of 15 feet (4.5 meters) away from electrical sources and power lines.



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.



The blades / cutting attachments are SHARP! Handle with care.



Be aware of the danger of falling debris.

General Safety Instructions

Work Safely

Attachments for this M231 Multipurpose Tool Carrier 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 your unit!*



WARNING!

Never make unauthorized attachment installations.

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 engine.

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.



WARNING!

Use Good Judgment

ALWAYS wear eye protection to shield against thrown objects.

ALWAYS protect yourself from hazards such as thorny brush and flying debris by wearing gloves and close fitting clothing that covers arms and legs. Never wear shorts. Don't wear loose clothing or items such as jewelry that could get caught in machinery or underbrush. Secure long hair so it is above shoulder level.

NEVER run the engine when transporting the unit.

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

ALWAYS clear your work area of trash or hidden debris that could be thrown back at you or toward a bystander.

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.

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.

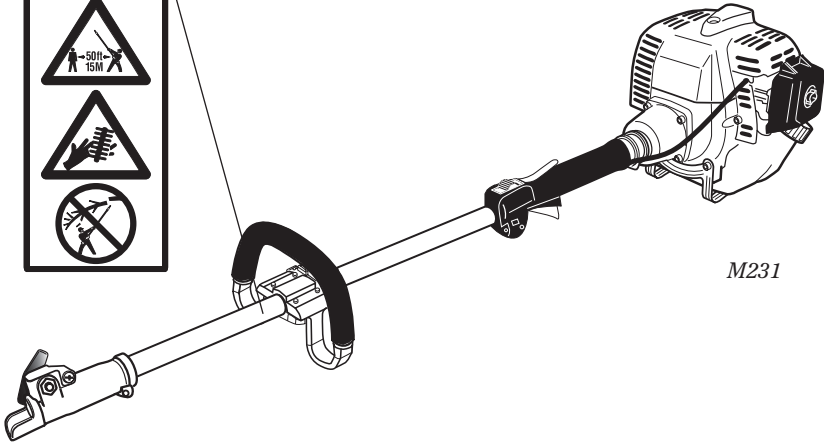
ALWAYS keep the handles clean.

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

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.



M231

Figure 1

Operating Precautions



WARNING!

- Always make sure the cutting attachment tool is properly installed and firmly tightened before operation.
- Never use a cracked or warped cutting attachment: replace it with a serviceable one and make sure it fits properly.
- Keep the unit away from excessive heat. Engine fuel is very flammable and fire could lead to serious personal injury or property damage.
- Make sure there are no missing or loose fasteners, and that the stop switch and throttle controls are working properly.
- Before starting the engine, make sure the cutting attachment 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.
- Never transport the unit or set it down with the engine running. An engine that's running could be accidentally accelerated causing the cutting attachment to rotate.
- Make sure cutter safety guards are in place when transporting the unit.

CAUTION!

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.

Product Description

M231 Multipurpose Tool Carrier

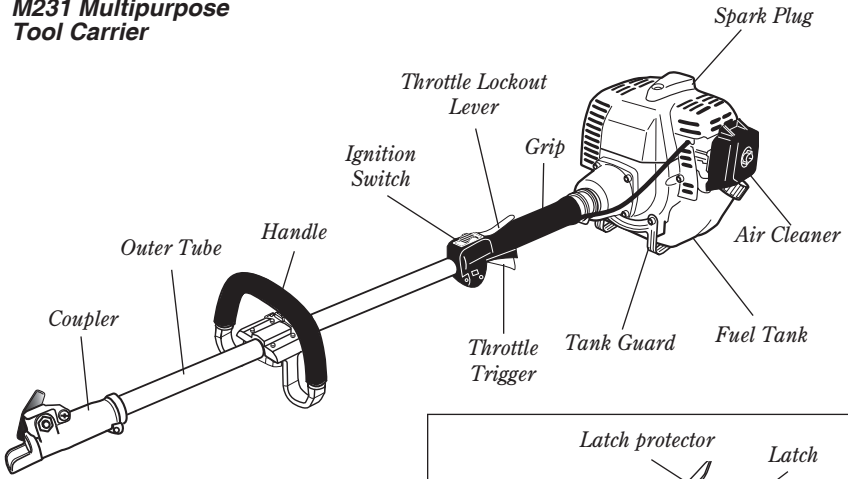


Figure 2

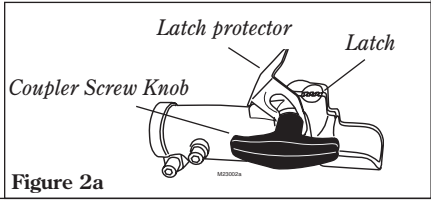



Figure 2a

Using the accompanying illustrations as a guide, familiarize yourself with your unit and its various components. Understanding your unit helps ensure top performance, long service life, and safer operation. See Figure 2 and 2a.

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

Specifications

M231 Multipurpose Tool Carrier dry weight (less attachments)	4.5 kg/9.8 lb.
Engine model	Shindaiwa S230C
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	0.8 kW/1.1 HP@ 7500 rpm (min ⁻¹)
Fuel/oil ratio.....	50:1 with ISO-L-EGD or JASO FC class 2-cycle Mixing Oil*
Fuel tank capacity	670 ml/22.7 oz.
Carburetor type	Walbro WYL-122 diaphragm-type
Muffler	2-Stage, Catalyst
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
Optional Assessories	Shoulder strap
EPA Emission Compliance Period*	Category A

* 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.

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meets or exceeds these specifications and is recommended for all Shindaiwa products.

Prior to Assembly

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

- Engine/Outer tube assembly
- Handle
- Kit containing handle mounting bracket and hardware, this owner's/operator's manual and tool kit for routine maintenance. Tool kits vary by model and may include a hex wrench, spark plug/screwdriver combination wrench, and spanner wrench.

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 Handle

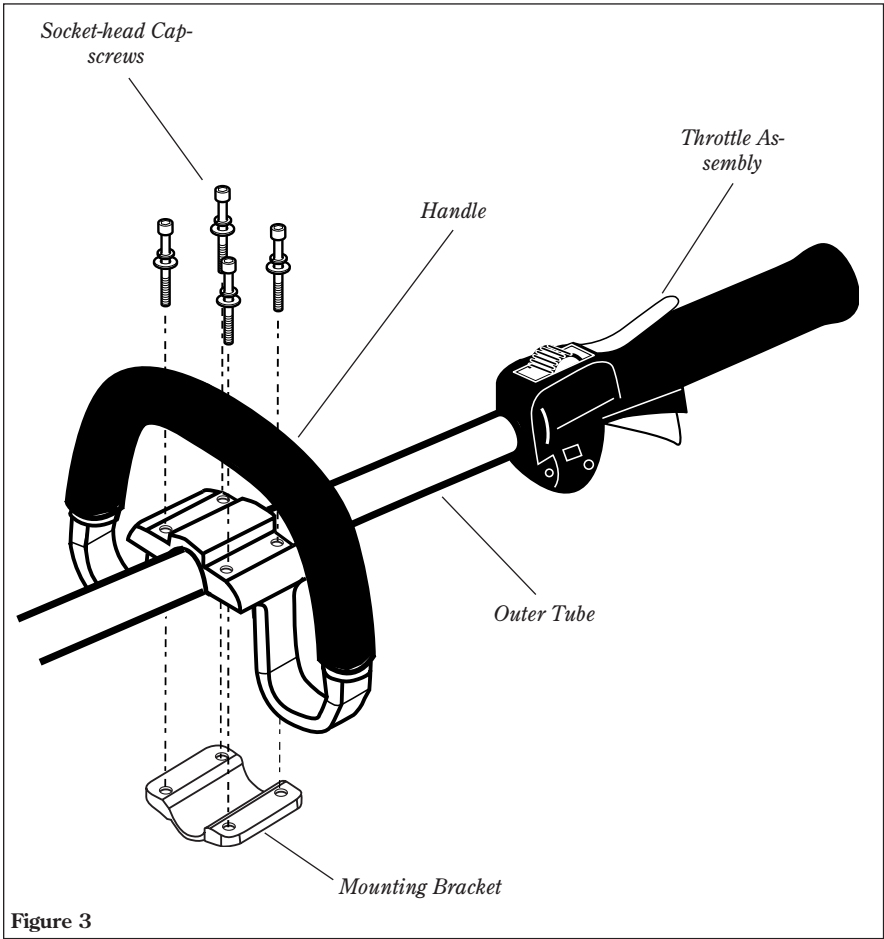


Figure 3

Connect the Handle to the Outer Tube.

1. Position the handle on the outer tube as shown. See Figure 3.
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 assembly).
4. Secure the handle by alternately tightening the four socket-head screws in a diagonal or “criss-cross” fashion.

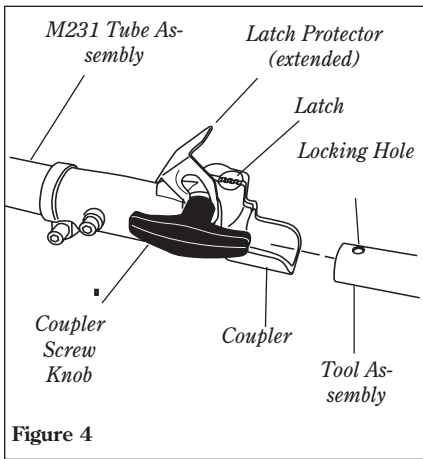
Installing a Tool Attachment

1. Place the M231 Multipurpose Tool Carrier and the Tool Assembly on a clean, flat surface so that both assemblies fit end to end. The M231 assembly should be facing up, and the tool assembly should be positioned with the locking hole in the tube end facing up. See Figure 4.

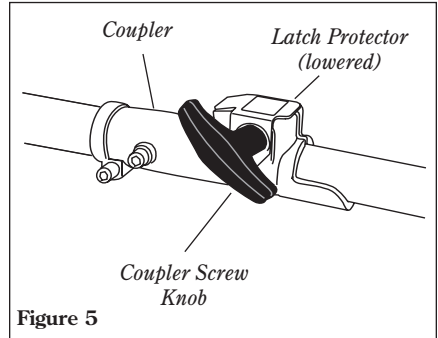
CAUTION!

Keep the open ends of the tubes clean and free of impurities!

2. Slip off the protective covers from the ends of both tubes, and loosen the coupler screw knob.
3. Insert the upper tube assembly into the coupler, with the tool decal facing up, until the line of the decal is flush with the end of the coupler. Twist the tool back and forth until you are sure it snaps in place by the coupler latch. See Figure 4.

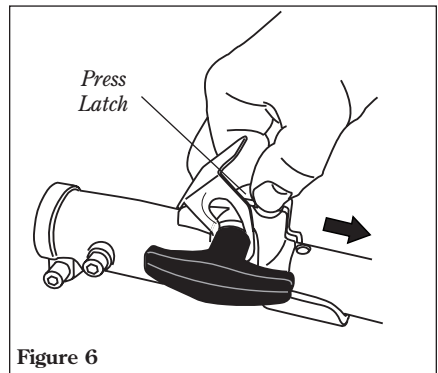


4. When the two tube halves are locked together, press down on the spring-loaded latch protector and tighten the coupler screw knob. See Figure 5.



Removing a Tool Attachment

1. With the unit on a clean, flat surface, loosen the coupler screw knob. The spring-loaded coupler protector should pop up.
2. Press down on the latch with your finger or thumb. This releases the coupler lock. See Figure 6.
3. Pull the tool assembly out of the coupler.



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 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 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  oil with fuel stabilizer is not used, it should first be treated with a fuel stabilizer such as StaBil™.

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.

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 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.

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.

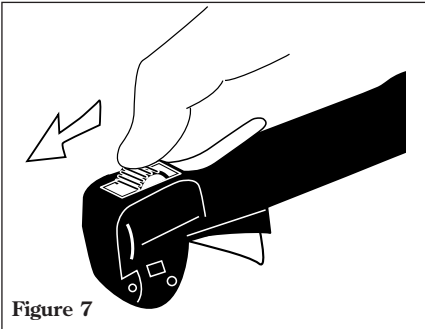


Figure 7

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

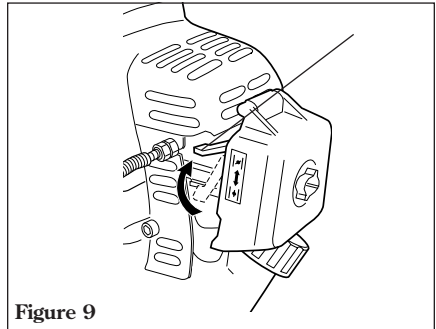


Figure 9

3. Set the choke lever to the CLOSED position if engine is cold.

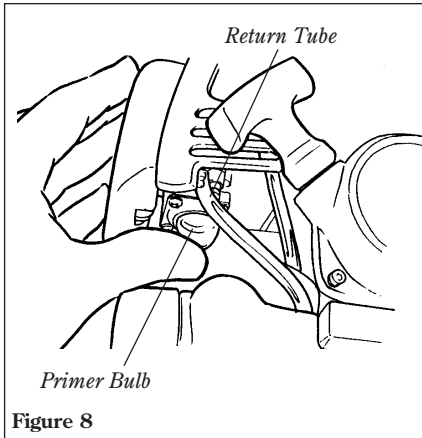


Figure 8

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.

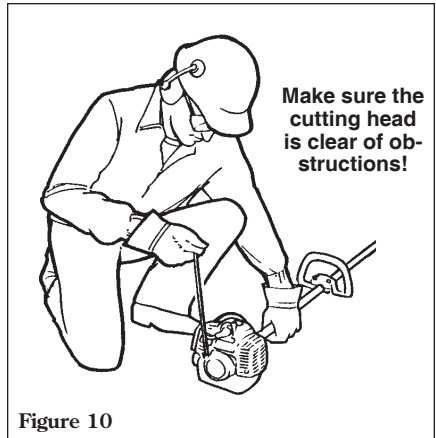


Figure 10

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.

Starting the Engine (Continued)



WARNING!

The cutting attachment may rotate when the engine is started!

- When the engine starts, slowly move the choke lever to the "OPEN" position. See Figure 11. (If the engine stops after the initial start, close the choke and restart.)

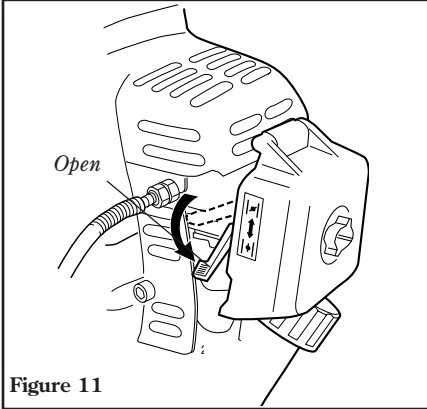


Figure 11



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 14.
- 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 (see the next page).

Stopping the Engine

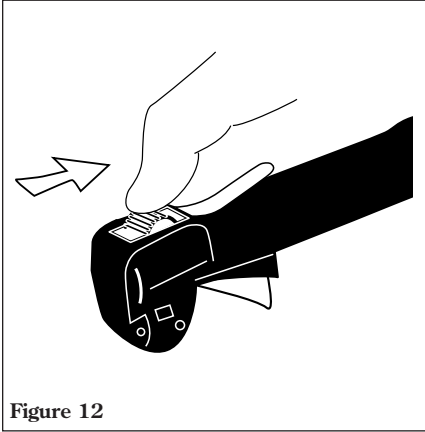


Figure 12

Idle the engine briefly before stopping (about 2 minutes), then slide the ignition switch to the “O” (engine OFF) position. See Figure 12.

Adjusting Engine Idle

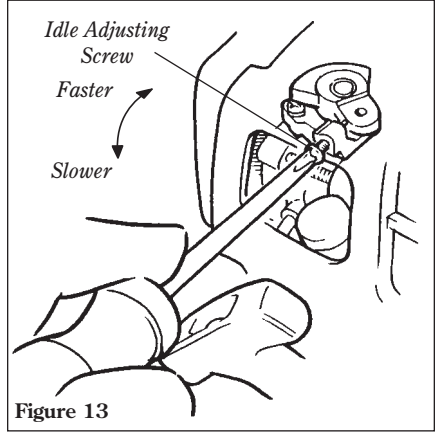


Figure 13

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.



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.

Idle Speed Adjustment

1. Place the unit on the ground, then start the engine and 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 13.
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 and cannot be serviced in the field.

Checking Unit Condition



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 unit. Do not make modifications to your unit without the written approval of Shindaiwa, Inc.

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

NEVER use a cracked or warped cutting attachment: replace it with a serviceable one.

ALWAYS make sure the cutting attachment fits properly into the appropriate cutting attachment holder. If a properly installed attachment vibrates, replace the attachment with a 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 entangled. 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 operate the unit with the cutting attachment shield or other protective devices (ignition switch etc.) removed!

Shoulder Strap

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

NOTE:

Although not required for use with Multipurpose Tool Carrier, an optional shoulder strap can increase operator comfort during extended periods of operation.

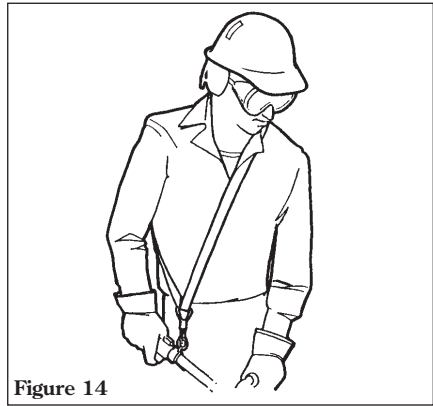


Figure 14

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

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 KOGYO CO., LTD. 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.

Daily Maintenance

Prior to each work day, perform the following:

- Remove dirt or debris from the engine, check the cooling fins and air cleaner for clogging and clean them as necessary.
- Carefully remove any accumulation of dirt or debris from the muffler or the fuel tank. Dirt build-up in these areas could cause engine overheating, induce premature wear, or create a fire hazard.
- 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

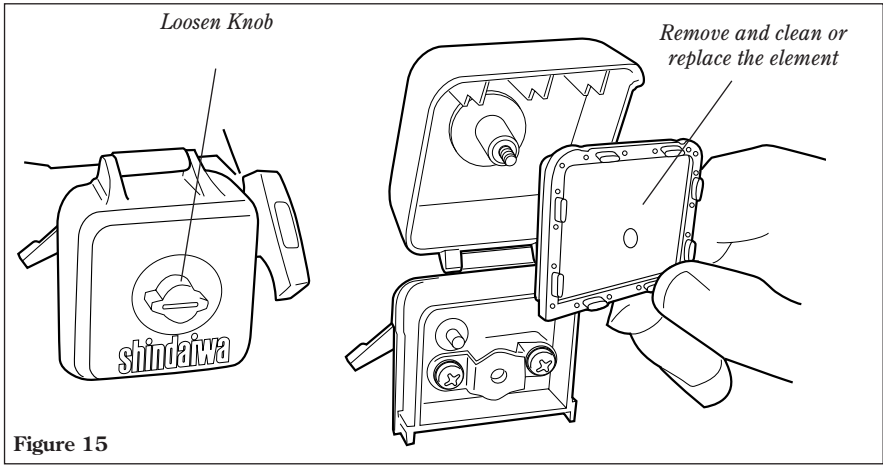


Figure 15

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 reassembling the element. See Figure 15.

CAUTION!

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

10/15-Hour Maintenance

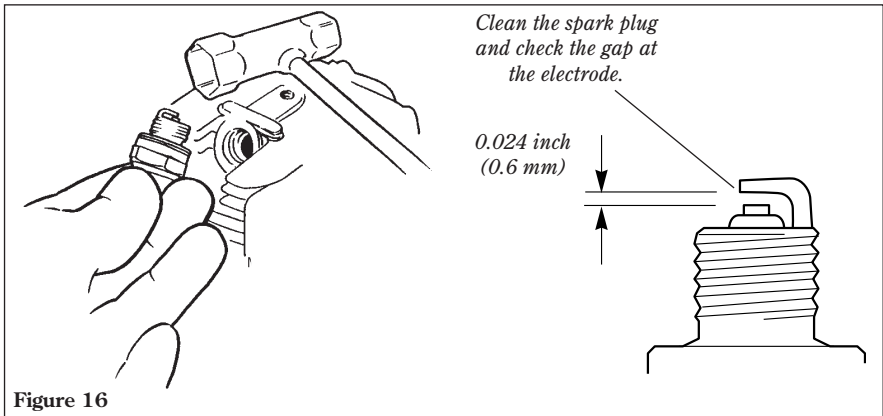


Figure 16

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 type spark plug of the correct heat range. For Electromagnetic Compliance (EMC) use NGK BMR6A. See Figure 16.

CAUTION!

Before removing the spark plug, clean the area around the plug to prevent dirt and debris from falling into internal engine parts.

MAINTENANCE

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.
- Use a hooked wire to extract the fuel filter from inside the fuel tank. See Figure 17. Remove and replace the filter element. Before reinstalling the filter, inspect the condition of the fuel line. If damage or deterioration are noted, the M231 Multipurpose Tool Carrier should be removed from service until it can be inspected by a Shindaiwa-trained service technician.

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.

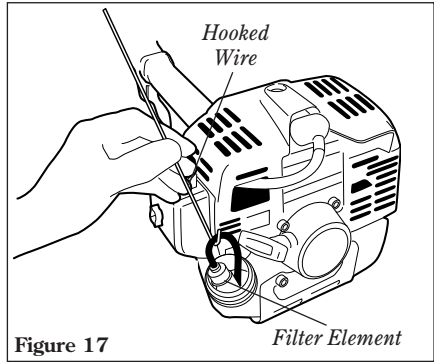


Figure 17

135-hour Maintenance

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



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 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 socket head screw and, while noting the orientation of parts, separate the muffler shield. See Figure 18.
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 with an authorized servicing dealer.

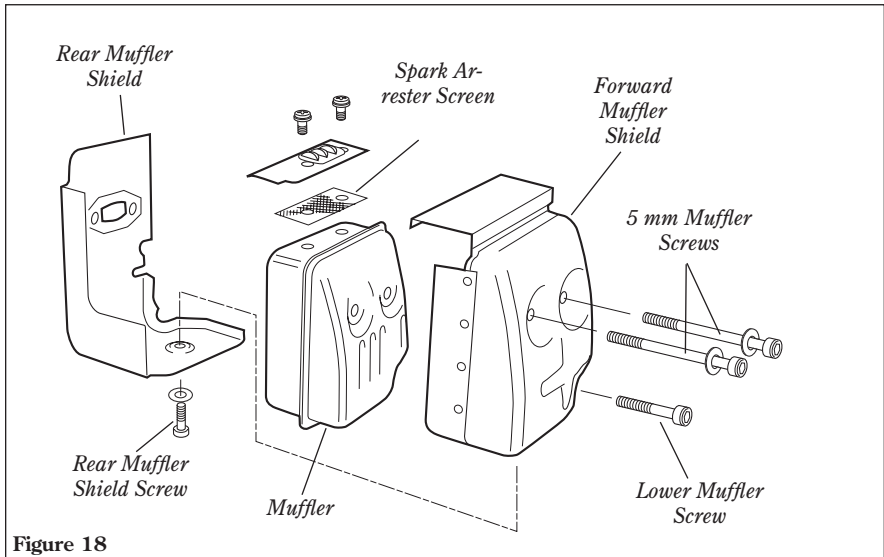



Figure 18

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  oil with fuel stabilizer is not used.

CAUTION!

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

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.
- 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.

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 or damage to 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 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.
Is fuel visible and moving in the return line when priming? YES ↓	NO → Check for clogged fuel filter and/or vent.	Clean 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.	<p>If the plug is wet, excess fuel may be in the cylinder.</p> <p>The plug is fouled or improperly gapped.</p> <p>The plug is damaged internally or of the wrong size.</p>	<p>Crank the engine with the plug removed, replace the plug, and re-start.</p> <p>Clean and re-gap the plug to 0.024 inch (0.6 mm). Re-start.</p> <p>Replace the plug with a CJ8 or equivalent resistor type spark plug of the correct heat range. Set spark plug electrode gap to 0.024-0.028 inch (0.6-0.7 mm). For Electromagnetic compliance (EMC) use NGK BMR6A. Restart.</p>

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.
	Carbon deposits on the piston or in the muffler.	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 cleaner.	Service the air cleaner element.
	Loose or damaged spark plug.	Tighten or replace. Replace the plug with a CJ8 or equivalent resistor type spark plug of the correct heat range. Set spark plug electrode gap to 0.024-0.028 inch (0.6-0.7 mm). For Electromagnetic compliance (EMC) use NGK BMR6A. Restart.
	Air leakage or clogged fuel line.	Repair or replace filter and/or fuel line.
	Water in the fuel.	Replace the fuel.
	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. 10). Refuel as necessary.
	Carbon deposits in the combustion chamber.	Consult with an authorized servicing dealer.

Troubleshooting Guide (Continued)

ADDITIONAL PROBLEMS

Symptom	Possible Cause	Remedy
Poor acceleration.	Clogged air cleaner.	Clean the air cleaner element.
	Clogged fuel filter.	Replace the fuel filter.
	Lean fuel/air mixture.	Consult with an authorized servicing dealer.
	Idle speed set too low.	Adjust: 2750 (\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.	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.	Tighten or replace the plug with a CJ8 or equivalent resistor type spark plug of the correct heat range. Set spark plug electrode gap to 0.024-0.028 inch (0.6-0.7 mm). For Electromagnetic compliance (EMC) use NGK BMR6A. Restart.
	Ignition failure.	Replace the ignition unit.
Engine difficult to shut off.	Piston seizure.	Consult with an authorized servicing dealer.
	Ground (stop) wire is disconnected or switch is defective.	Test and replace as required.
	Overheating due to incorrect spark plug.	Replace the plug with a CJ8 or equivalent resistor type spark plug of the correct heat range. Set spark plug electrode gap to 0.024-0.028 inch (0.6-0.7 mm). For Electromagnetic compliance (EMC) use NGK BMR6A. Restart.
Cutting attachment rotates at engine idle.	Overheated engine.	Idle engine until cool. Refer to page 21 (overheated engine)
	Engine idle too high.	Set idle: 2750 (\pm 250) rpm (min^{-1})
Cutting attachment rotates at engine idle.	Broken clutch spring or worn clutch spring boss.	Replace spring/shoes as required, check idle speed.
	Loose attachment holder.	Inspect and re-tighten holders securely.

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.
Cutting attachment will not rotate.	Shaft not installed in powerhead or gearcase.	Inspect and reinstall as required.
	Broken shaft.	Consult with an authorized servicing dealer.
	Damaged gearcase.	Consult with an authorized servicing dealer.

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.

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:

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