

HONDA

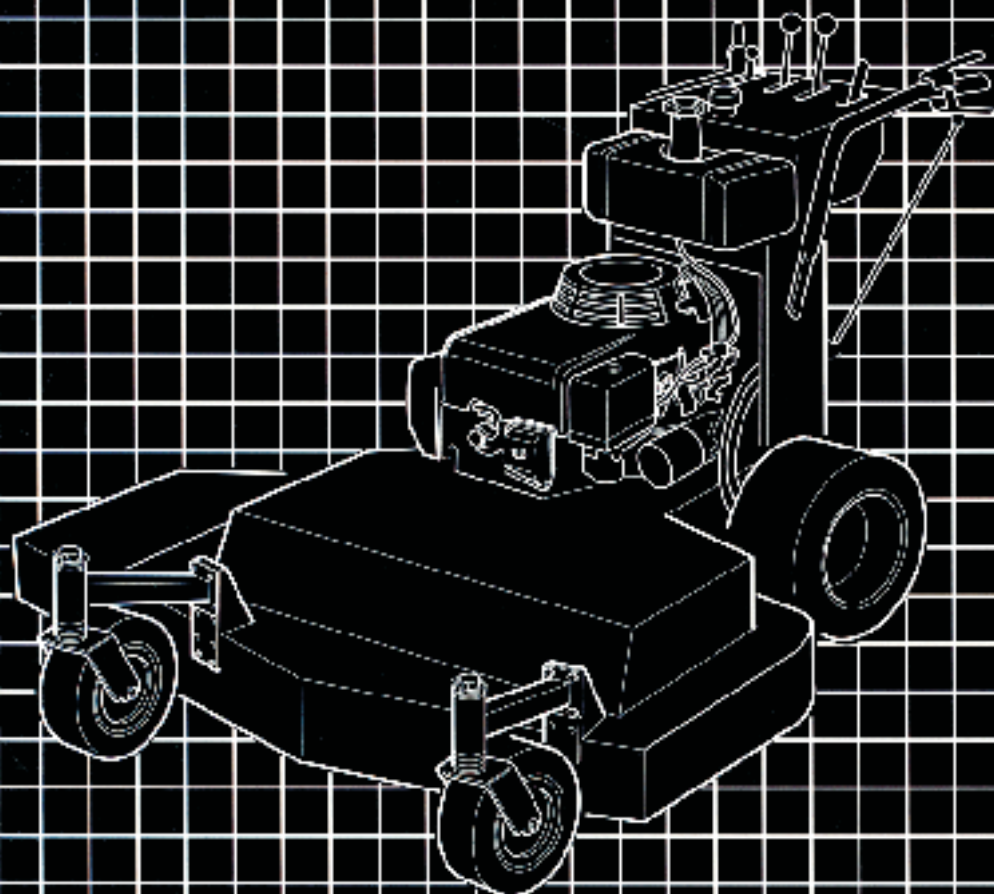
Power

Equipment

Owner's Manual

Mid-Size Commercial Mower

HRC 7013



Keep this owner's manual handy, so you can refer to it anytime, and make sure the manual stays with the lawn mower if you sell it.

This owner's manual is considered a permanent part of the lawn mower. It must be available to all operators of the mower and should remain with the mower if resold.

The information and specifications in this publication were in effect at the time of approval for printing. American Honda Motor Co., Inc. reserves the right to discontinue or change specifications or design at any time without notice and without incurring any obligation whatever.

Your mower is not equipped with a spark arrestor and it may be illegal to operate the mower in some areas. Check local laws and regulations. An optional spark arrestor is available from authorized Honda servicing dealers.

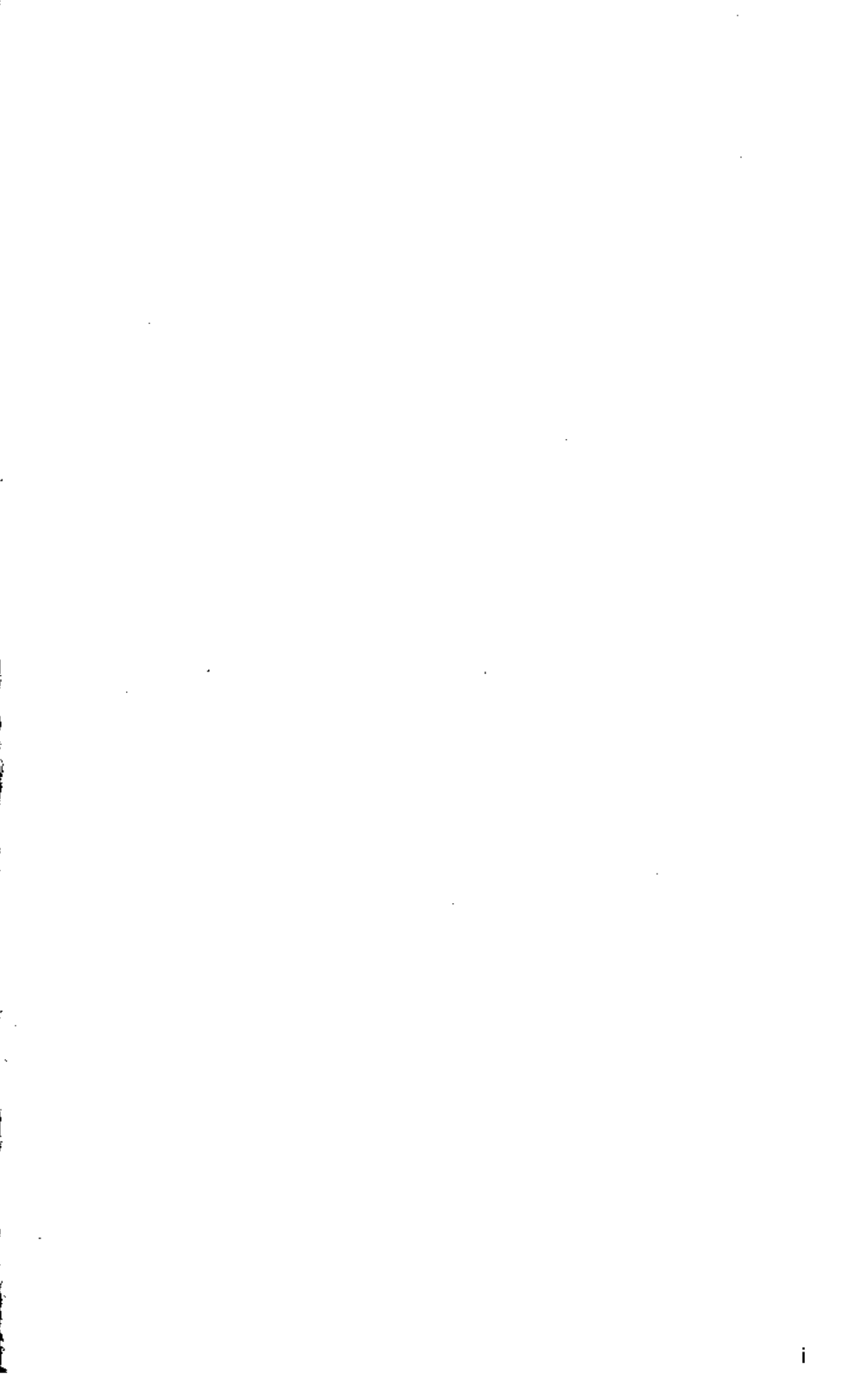
Honda lawn mowers meet Consumer Product Safety Commission (CPSC) blade safety requirements for walk-behind rotary mowers.



WARNING:



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



Congratulations on your selection of the Honda Commercial Mower! We are certain you will be pleased with your purchase.

You can enhance the performance of your new mower by taking time to study this manual. In it you'll learn how to use it safely and efficiently. The service interval and maintenance recommendations in this manual were developed to give you the optimum performance and service life of your mower. We suggest you follow them.

Please take time to read the warranty policy so that you fully understand the coverages and the responsibilities of ownership. The warranty policy is a separate document that should have been given to you by your dealer.

Your authorized Honda servicing dealer and his staff are specially trained in the service and maintenance of your mower and are supported by the parts and service divisions of American Honda. Your Honda dealer is dedicated to your satisfaction and will be pleased to answer your questions and concerns.

When you contact your Honda dealer about your mower, he'll need to know the serial numbers of the engine, power unit, and mower deck. Write those numbers in the space below for future reference.

Best wishes,
Power Equipment Division
American Honda Motor Co., Inc.


Engine number _____

Power Unit number _____

Mower Deck number _____

Safety Messages

Your safety and the safety of others is very important. We have provided important safety messages in this manual and on the lawn mower. Please read these messages carefully.

A safety message alerts you to potential hazards that can hurt you and others. Each safety message is preceded by a safety alert symbol  and one of three words: DANGER, WARNING, or CAUTION.

These mean:

DANGER

You **WILL** be KILLED or SERIOUSLY HURT if you don't follow instructions.

WARNING

You **CAN** be KILLED or SERIOUSLY HURT if you don't follow instructions.

CAUTION

You **CAN** be HURT if you don't follow instructions.

Each message tells you what the hazard is, what can happen, and what you can do to avoid or reduce injury.

Damage Prevention Messages

You will also see other important messages that are preceded by the word NOTICE.

This word means:

NOTICE

Your lawn mower or other property can be damaged if you don't follow instructions.

The purpose of these messages is to help prevent damage to your lawn mower, other property, or the environment.

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MOWER SAFETY

This section explains what you need to know to operate your mower safely.

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Safety Information

Most accidents with walk-behind mowers can be prevented if you follow all instructions in this manual and on the mower.

The most common hazards, according to accident statistics, are discussed below, along with the best way to protect yourself and others.

Avoid Rotating Blades

A rotating blade can cause serious cuts and even amputate fingers, hands, toes, or feet. Keep away from the mower deck whenever the engine is running. If you need to work around the deck to clear a grass accumulation, adjust the cutting height, or for any other reason, always shut off the engine and remove the key. Wear heavy gloves when you need to clean the mower deck or handle a blade.

Clear Mowing Area

Mower blades can throw rocks and other objects with enough force to cause serious injury. Before mowing, carefully inspect the area and remove all sticks, stones, pieces of wire, and other loose objects. Never operate the blades over gravel.

Keep Shields in Place

Guards and shields are designed to protect you from being hit by thrown objects and from touching hot engine parts and moving components. For your safety and the safety of others, keep all shields in place when the engine is running.

Refuel with Care

Gasoline is extremely flammable and gasoline vapor can explode. Refuel only outdoors in a well-ventilated area with the engine OFF. Never smoke near gasoline, and keep other flames and sparks away. Always store gasoline in an approved container.

Wear Protective Clothing

Wearing protective clothing will reduce your risk of injury. Long pants and eye protection reduce the risk of injuries from thrown objects. Sturdy shoes with aggressive soles will help protect your feet and give you better traction on slopes or uneven ground. Ear protection and a helmet may be required by local ordinances or insurance policies.

Turn Engine Off When Not Mowing

If you need to leave the mower for any reason, even just to inspect the lawn ahead, always turn the engine off. And take the key if you go farther away.

Important Message to Employers

As an employer, you have special responsibilities to the people who work for you.

Before you ask anyone to operate this mower, you need to determine whether the person is old enough, large enough, and strong enough to safely handle and control the mower.

If you decide they are, make sure the employee reads and understands all instructions and warnings in this manual and on the labels before operating the mower.

Allow adequate time for hands-on training by a qualified instructor, and personally supervise practice sessions until you feel sure the employee is ready to operate the machine.

Also be sure employees wear proper clothing and have eye protection and any other gear that may be required by local ordinances or your insurance company.

Remember, too, that you are responsible for keeping the mower properly maintained and in safe operating condition.

Your commitment to safety on the job can help prevent accidents and result in longer and more productive years of service.

Safety Label Locations

These labels warn you of potential hazards that can cause serious injury. Read them carefully.

If a label comes off or becomes hard to read, contact your Honda Commercial Mower dealer for a replacement.

WARNING

Objects hidden in the lawn can be thrown by the mower blade. Thrown objects can cause serious injury.

- Clean lawn of all debris before mowing.
- Do not operate the mower without either the discharge guard or the entire grass catcher in place.
- Wear eye protection.
- Keep people away while mowing.

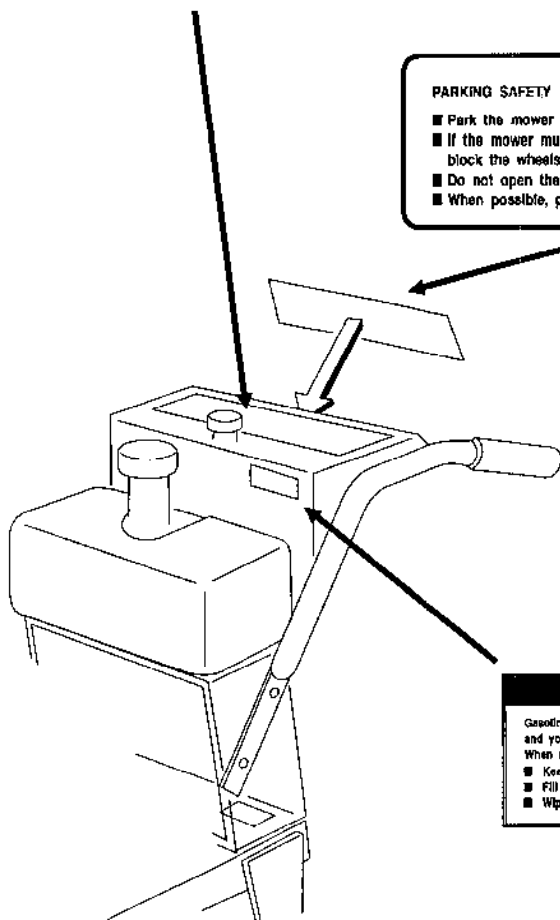
SPECIAL TRAINING IS NECESSARY

Do not operate this mower without adequate training.

- Read Owner's Manual carefully.
- Learn the location and function of all controls.
- Do not allow children to operate this machine.
- Stop engine before performing maintenance.

PARKING SAFETY

- Park the mower on a firm, level surface when possible.
- If the mower must be parked on a slope, block the wheels so the mower can not roll.
- Do not open the bypass valves when parked on a slope.
- When possible, park machine on level surface.



WARNING

Gasoline is highly flammable and explosive and you can be burned or seriously injured. When refueling:

- Keep hair, apron, and open flames away.
- Fill fuel tank only outdoors.
- Wipe up spills before starting engine.

⚠ WARNING



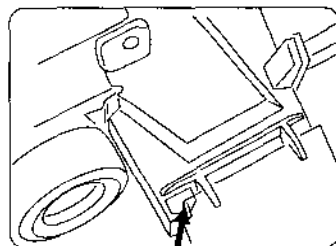
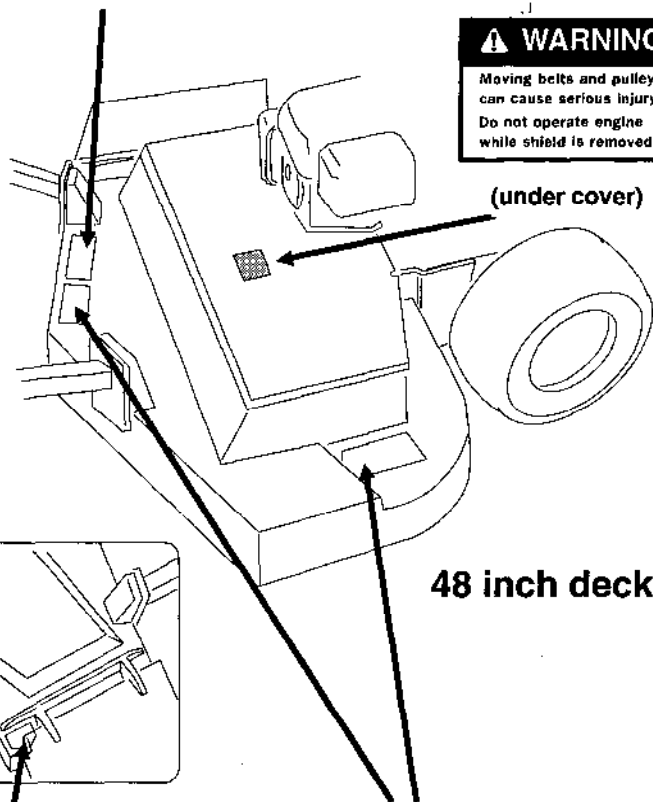
Objects hidden in the lawn can be thrown by the mower blade.

Thrown objects can cause serious injury.

- Clear lawn of all debris before mowing.
- Do not operate the mower without either the discharge guard or entire grass catcher in place.
- Wear eye protection.
- Keep people and pets away.

⚠ WARNING

Moving belts and pulleys can cause serious injury. Do not operate engine while shield is removed.



⚠ DANGER



SHARP BLADE

You will be seriously cut by the rotating blade.

Keep hands and feet away when engine is running.

⚠ WARNING



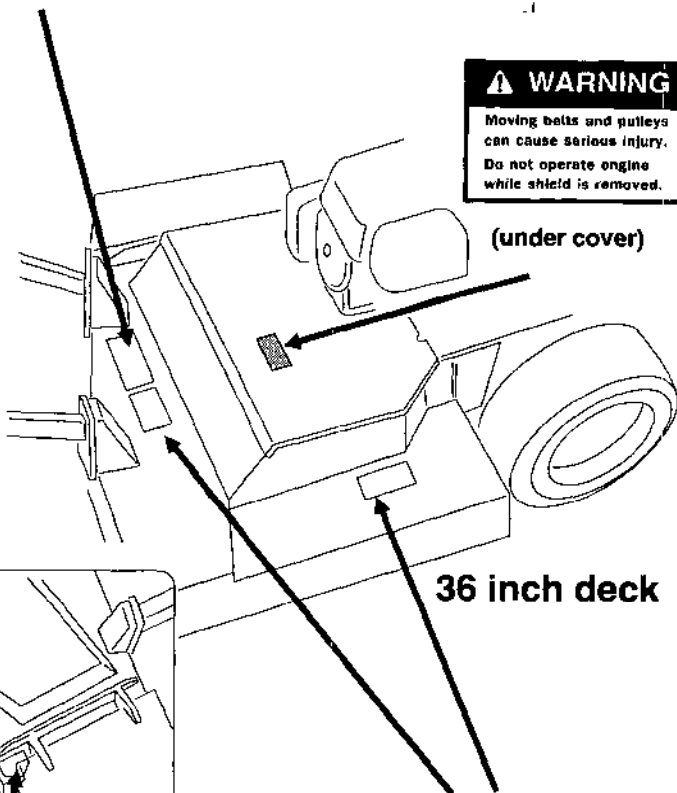
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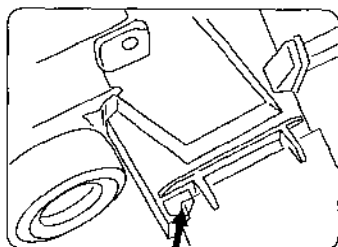
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36 inch deck



⚠ DANGER



SHARP BLADE

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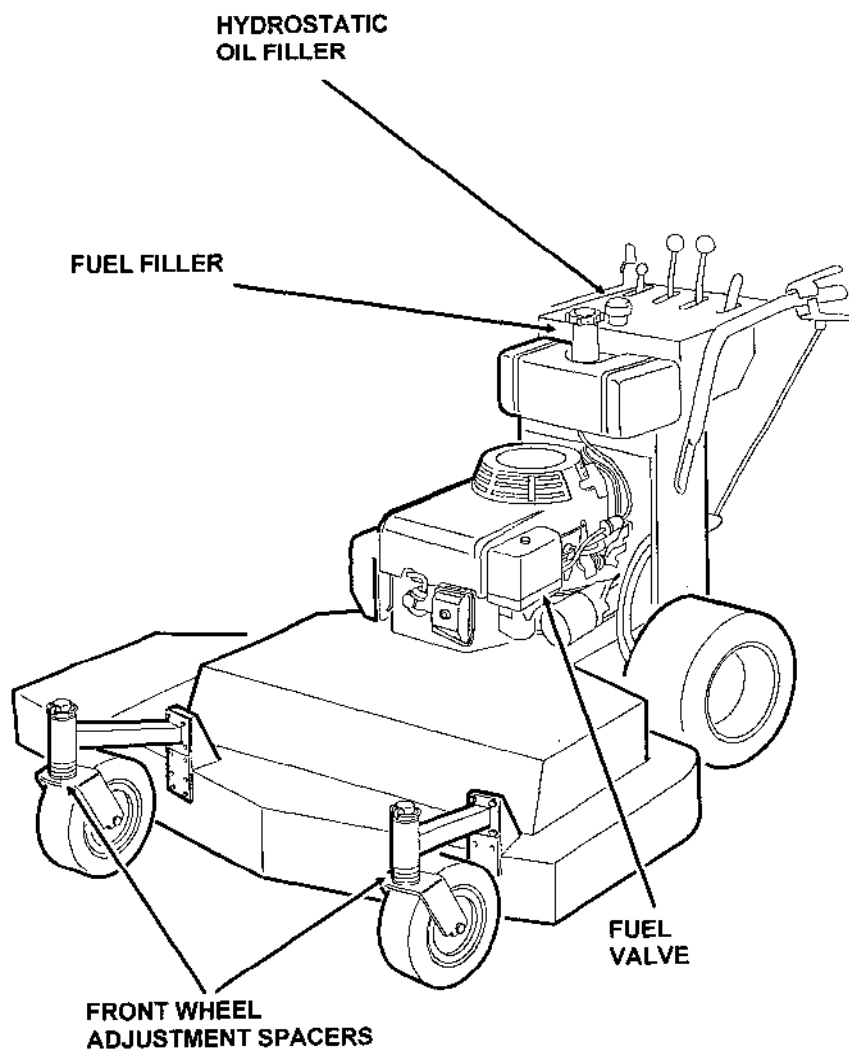
CONTROLS & INDICATORS

This section shows you where controls are located and tells you what they do and how they work.

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Locations

This shows where to find the most frequently used controls.



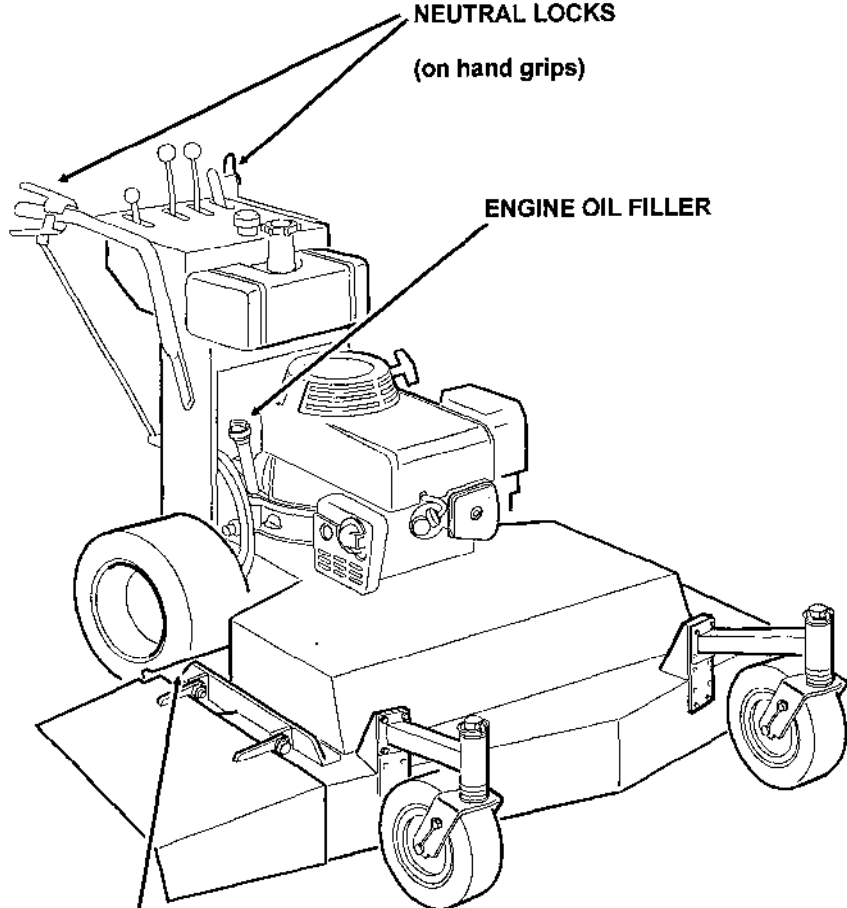
DIRECTION CONTROL LEVERS

OPERATOR PRESENCE LEVERS

NEUTRAL LOCKS

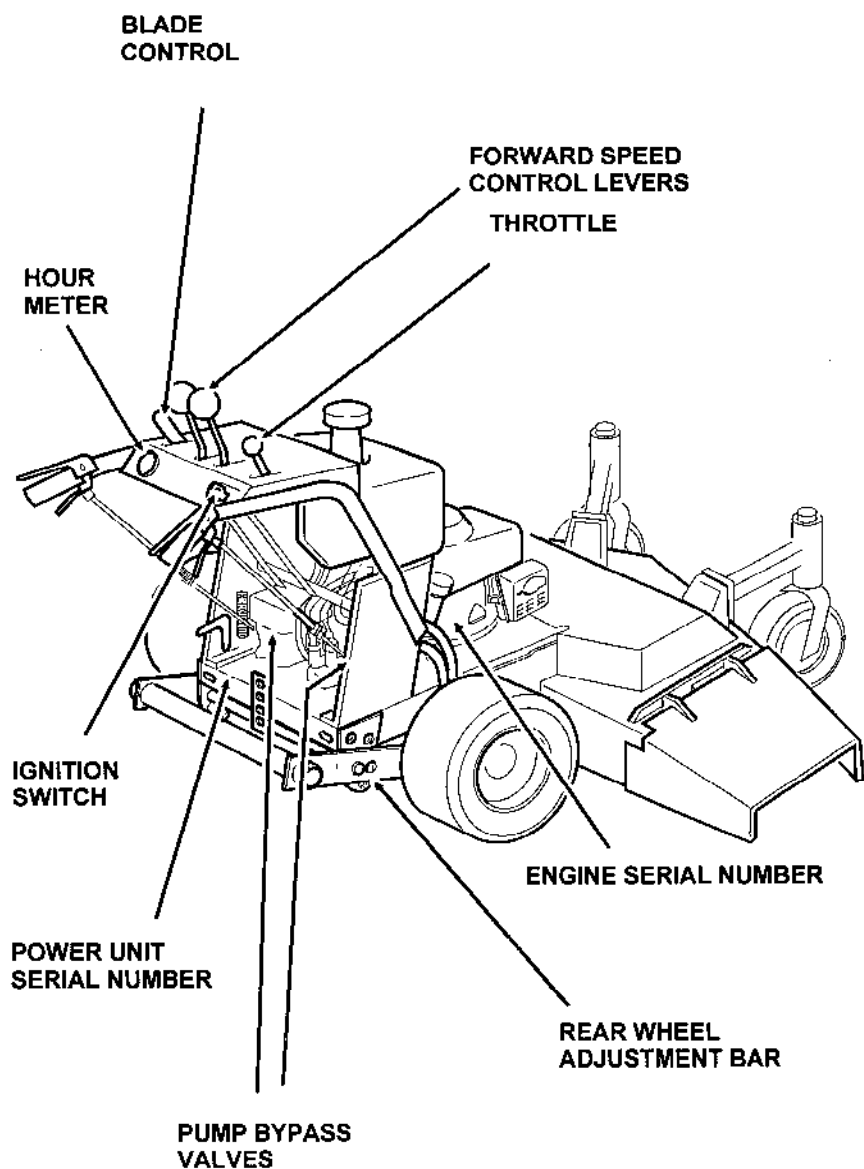
(on hand grips)

ENGINE OIL FILLER



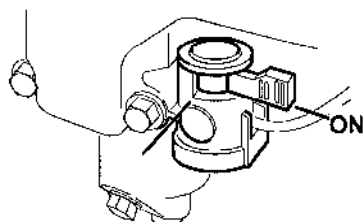
**MOWER DECK SERIAL
NUMBER**

CONTROLS & INDICATORS



Controls

You will use these controls every time you operate the mower



Fuel Valve

This valve is located on the carburetor and allows fuel to flow to the engine. Push it toward the engine to ON to allow fuel to flow, or pull it outward for OFF.

Ignition Switch

The ignition switch controls the engine ignition system. Turn the key clockwise to the ON position, or turn the key counter clockwise to the OFF position.

Throttle

The throttle lever controls engine speed. Pull it rearward to the SLOW position for idle. Push it forward to the FAST position for mowing. Pushing it forward past a detent for the CHOKE position applies the choke for starting a cold engine.

Forward Speed Control

The forward speed control levers set the maximum forward speed of the mower. The rear position is NEUTRAL. As the levers are pushed forward, the maximum speed of the mower progressively increases. See page 32 for details.

Blade Control

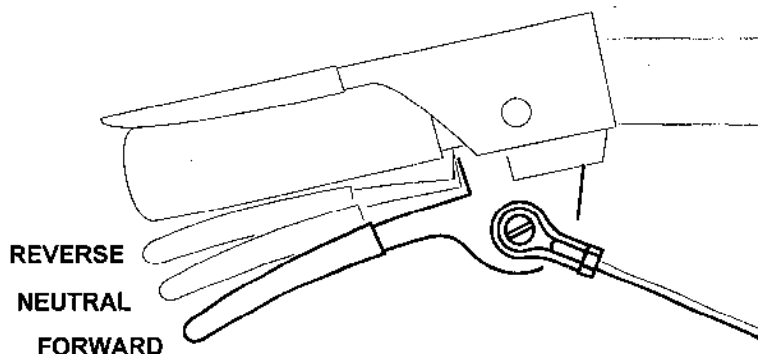
The blade control lever engages engine power to the mower deck. The forward position is ON, The rear position is OFF.

Operator Presence Levers

The operator presence levers above the hand grips are part of the safety interlock system. When the blade control is ON or the forward speed controls are forward of NEUTRAL, you must hold at least one lever down on the hand grips. If you don't, the engine will shut off.

Direction Controls

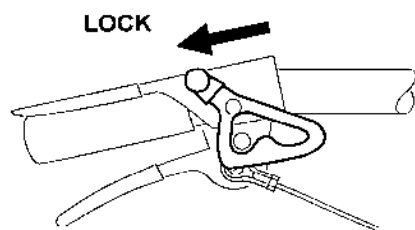
The direction control levers independently control each drive wheel for steering, slowing, and reversing. Squeezing the levers toward the hand grips slows the mower from the maximum forward speed. Squeezing the levers further to their neutral position stops forward motion. Squeezing the levers past neutral reverses direction.



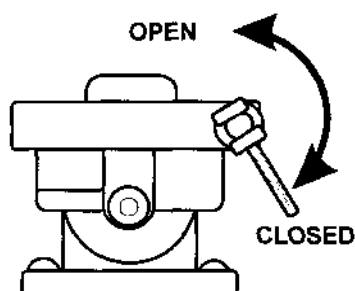
The use of the direction control levers is explained on page 29.

Neutral Lock

The neutral locks hold the direction control levers in their neutral position. Pulling the locks rearward prevents the direction control levers from going into their forward position. The levers can still be squeezed for reverse, however. When the neutral locks are engaged and you release the levers after reversing, they will return to neutral.



Pump Bypass Valves



The bypass valves on each drive pump allow you to move the mower when the engine is not running. Open the valves by turning them one turn counterclockwise. See pages 16, 28.

Front-Wheel Adjustment Spacers

The front-wheel adjustment spacers allow adjustment of the cutting height in either of two ranges: a low range of 38 mm to 89 mm ($1\frac{1}{2}$ - $3\frac{1}{2}$ in), and a high range of 89 mm to 140 mm ($3\frac{1}{2}$ - $5\frac{1}{2}$ in). Their use is explained on page 63.

Rear-Wheel Adjustment Bar

The rear-wheel adjustment bar allows adjustment of the cutting height in either of two ranges: a low range of 38 mm to 89 mm ($1\frac{1}{2}$ - $3\frac{1}{2}$ in), and a high range of 89 mm to 140 mm ($3\frac{1}{2}$ - $5\frac{1}{2}$ in). Its use is explained on page 64.

Indicators

These indicators help you monitor the condition of the mower.

Hour meter

The hour meter indicates the total operating time of the mower in hours and tenths of an hour. It operates whenever the engine is running.

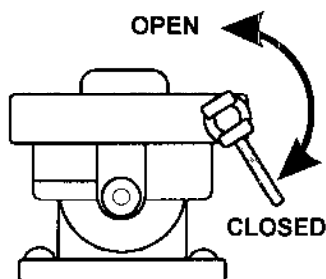
OIL ALERT™ Buzzer

The Honda OIL ALERT buzzer will sound whenever the engine oil level is below a safe operating level. Whenever you hear the buzzer, stop the engine and check the oil level (page 46).

TRANSPORTING and STORING

This section tells you how to safely transport and store your mower.

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There is one very important thing to remember when transporting your mower: when you open the pump bypass valves to move the mower without the running engine, you disable all braking action. For this reason:

- Always close both pump bypass valves after moving the mower by hand.
- Always drive the mower under its own power on any incline.
- If you must move the mower on an incline without running the engine, use a suitable device (winch, block & tackle, come-along). Remember that the mower weighs over 272 kg (600 lb).
- When moving the mower without running the engine, do not move it at more than a walking speed or more than 91 meters (100 yd). Be sure the bypass valves are open at least one turn but not more than two turns.

See page 28 for more information on operating the bypass valves.

Transporting your Mower

Use a loading ramp to get the mower on and off the vehicle. Be sure both the ramps and vehicle are able to support the weight of the mower and operator.

When the mower is in position, turn the fuel valve OFF to prevent the possibility of fuel leaking.

Tie the mower down, front and rear, with ropes or straps. You may use the front caster brackets and the rear cross member to tie the mower down. Be careful not to damage hoses or linkages when tightening the ropes or straps.

Remember that the engine and exhaust system become hot during operation. Avoid touching them.

Storing your Mower

When leaving your mower unattended, always:

- Turn the key off and remove it from the ignition switch.
- Turn the fuel valve off.
- If you opened the pump bypass valves, close both of them.
- If you're leaving the mower on a slope — even a slight one — block both drive wheels front and rear.

Storage Preparation

Proper storage preparation is essential for keeping your mower trouble free and looking good. The following steps will help to keep rust and corrosion from impairing your mower's function and appearance, and will make the engine easier to start when you use the mower again.

Cleaning

Wash the mower, including the underside of the mower deck.

Engine

Wash the engine by hand, and be careful to prevent water from entering the air cleaner.

NOTICE

Using a garden hose or pressure washing equipment can force water into the air cleaner. Water in the air cleaner will soak the filters and can enter the carburetor or engine cylinder, causing damage.

Water contacting a hot engine can cause damage. If the engine has been running, allow it to cool for at least half an hour before washing.

Mower Deck

If using a garden hose or pressure washing equipment to clean the mower deck, be careful to avoid getting water into controls and cables, or anywhere near the engine air cleaner or muffler opening.

NOTICE

Spraying water on hot mower deck bearings can cause them to be damaged from cooling too quickly.

Before washing the underside of the mower deck, be sure the parking brake is set and the height adjustment lever is all the way up.

Grass Bag (optional kit)

Remove the grass bag from the frame, and wash it with a garden hose or pressure washing equipment. Allow the bag to completely dry before storage.

After washing the mower, wipe dry all accessible surfaces.

Start the engine outdoors, and let it run until it reaches normal operating temperature to evaporate any water remaining on the engine.

While the engine is running, hold the operator presence levers and operate the PTO clutch lever to expel water from the blade pulleys, spindles, and other mower deck items. Allow the blades to spin for several minutes to ensure that no water remains.

Stop the engine and allow it to cool.

After the mower is clean and dry, touch up any damaged paint and coat other areas with a light film of oil. Lubricate the throttle cable core with a silicone spray lubricant.

Fuel

Gasoline will oxidize and deteriorate in storage. Old gasoline will cause hard starting, and it leaves gum deposits that clog the fuel system. If the gasoline in your mower deteriorates during storage, you may need to have the carburetor and other fuel system components serviced or replaced.

The length of time that gasoline can be left in your fuel tank and carburetor without causing functional problems will vary with such factors as gasoline blend, your storage temperatures, and whether the fuel tank is partially or completely filled. The air in a partially filled fuel tank promotes fuel deterioration. Very warm storage temperatures accelerate fuel deterioration. Fuel deterioration problems may occur within a few months, or even less if the gasoline was not fresh when you filled the fuel tank.

Fuel system damage or engine performance problems resulting from neglected storage preparation are not covered under warranty.

You can extend fuel storage life by adding a gasoline stabilizer that is formulated for that purpose, or you can avoid fuel deterioration problems by draining the fuel tank and carburetor.

Adding a Gasoline Stabilizer to Extend Fuel Storage Life

When adding a gasoline stabilizer, fill the fuel tank with fresh gasoline. If only partially filled, air in the tank will promote fuel deterioration during storage. If you keep a container of gasoline for refueling, be sure that it contains only fresh gasoline.

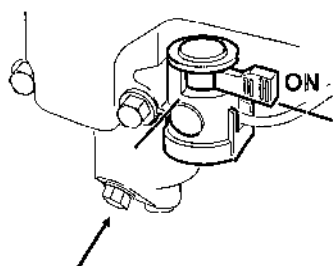
Add gasoline stabilizer following manufacturer's instructions.

After adding a gasoline stabilizer, run the engine outdoors for 10 minutes to be sure that treated gasoline has replaced the untreated gasoline in the carburetor.

Stop the engine, and turn the fuel valve to the OFF position.

Draining the Fuel Tank and Carburetor

Loosen the carburetor drain screw and turn the fuel valve ON.



DRAIN SCREW

⚠ WARNING

Gasoline is highly flammable and explosive and you can be burned or seriously injured when handling fuel.

Stop engine and keep heat, sparks, and flame away.

Refuel only outdoors.

Wipe up spills immediately.

Drain the fuel into an approved gasoline container. Reinstall the drain bolt.

Engine Oil

Change the engine oil (page 46).).

Remove the spark plug (page 49).).

Pour a tablespoon (5 ~ 10 cc) of clean engine oil into the cylinder.

Pull the starter rope a few times to distribute the oil in the cylinder.

Reinstall the spark plug.

Grease

Lubricate all grease points (page 55).).

Transmission

Check the hydrostatic oil and top off if necessary (page 54).

Tires

Check tire air pressure (page 62).).

Placing in Storage

If your mower will be stored with gasoline in the fuel tank and carburetor, it is important to reduce the hazard of gasoline vapor ignition. Select a well-ventilated storage area away from any appliance that operates with a flame, such as a furnace, water heater, or clothes dryer. Also avoid any area with a spark-producing electric motor, or where power tools are operated.

If possible, avoid storage areas with high humidity, because that promotes rust and corrosion.

Unless all fuel has been drained from the fuel tank, leave the fuel valve in the OFF position to reduce the possibility of fuel leakage.

Park the mower on a level surface. Tilting can cause fuel or oil leakage.

With the engine and exhaust system cool, cover the mower to keep out dust. A hot engine and exhaust system can ignite or melt some materials. Do not use sheet plastic as a dust cover. A nonporous cover will trap moisture around the mower, promoting rust and corrosion.

Removal From Storage

Check your mower as described in the *Before Mowing* chapter of this manual.

If the fuel was drained during storage preparation, fill the tank with fresh gasoline. If you keep a container of gasoline for refueling, be sure that it contains only fresh gasoline. Gasoline oxidizes and deteriorates over time, causing hard starting.

If the cylinder was coated with oil during storage preparation, the engine may smoke briefly at startup. This is normal.

BEFORE MOWING

This section shows you how to prepare your mower, the lawn, and yourself.

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Check the Mower

For your safety and the service life of your equipment, always inspect your mower before using it. Before beginning your pre-operation check, be sure:

- The mower is parked on a level surface.
- The blade control lever is disengaged and the ground speed control levers are in **NEUTRAL**.
- The ignition switch is off and the key is removed.

Walk around the mower and check its general condition. Look around and underneath it for signs of fluid leaks. Remove any excessive dirt and debris, especially around moving components. Look for signs of damage. Check nuts, bolts, screws, and pins for tightness.

Never operate the mower with the safety interlock system inoperative. Do not attempt to bypass or defeat the system.

Keep all shields and covers in place while operating the mower. If you find any problems or defects, have them repaired before mowing.

Blades

Before each use, check each mower blade for damage or abnormal wear. See page 67 for details.

Belts

Check the blade, deck, and pump belts for wear and correct tension. See page 70 for details.

Engine Oil

Check the level on the dipstick. Running the engine with a low oil level will cause engine damage. See page 46 for details.

Hydrostatic Oil

Check the oil level in the reservoir. See page 54 for details.

Fuel

Remove the cap on the tank and check the fuel level. See page 43 for refueling details.

Air Filter

Check that the air cleaner elements are clean and in good condition. See page 42 for information on servicing the air cleaner.

Cutting Height

The cutting height of your mower should be set for the mowing conditions and should be in the same position, front and rear. See page 63 to adjust cutting height.

Tire Pressure

Check the tires for proper inflation (page 62).

Check the Lawn

For your safety and the safety of others, always inspect the area before mowing.

Objects

Anything which can be picked up by the blades and thrown is a potential hazard to you and others. Look for things like stones, sticks, bones, and wire, and remove them from the mowing area.

People

People and animals near the mowing area can move into your mowing path or into a position where they could be struck by thrown objects. Clear the area of people, especially children and pets. Their safety is your responsibility.

Lawn

Check the length and condition of the grass. Adjust your mowing speed and cutting height accordingly.

Avoid mowing wet grass. Not only does mowing wet grass result in poor cut quality, it also affords poor traction, increasing your risk of losing your footing.

Prepare Yourself

Your safety is your responsibility. A little time spent in preparation will significantly reduce your risk.

Knowledge

Read and understand this manual. Know what the controls do and how to operate them.

Familiarize yourself with the mower and its operation before you begin mowing. Know what to do in case of emergencies.

Clothing

Wearing protective clothing will reduce your risk of injury.

Long pants and eye protection reduce the risk of injuries from thrown objects.

Sturdy shoes with aggressive soles will help protect your feet and give you better traction on slopes or uneven ground.

While the sound level of the mower is well within safe limits, hearing protection will further protect your hearing.

OPERATING THE MOWER

This section tells you how to operate the mower for safe and effective mowing.

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Using the Direction Controls _____	29
Starting to Mow _____	32
Adjusting your Speed _____	32
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Parking the Mower _____	34

The Honda Mid-Size Commercial Mower is a powerful, highly maneuverable mower designed to enhance the productivity of a lawn-care professional. You will need a complete understanding of its operation and a certain amount of practice with its controls to safely realize the full potential of this mower.

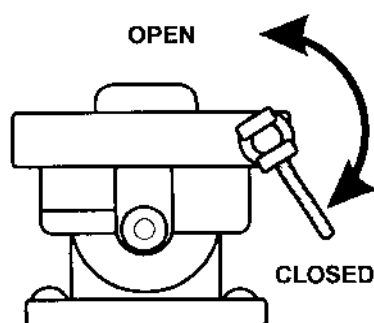
Read this section completely before operating the mower. Take time to familiarize yourself with the controls and how they operate. Get used to the feel of the forward speed controls and direction control levers by running the engine at about half-throttle.

The small amount of time spent in familiarization will reward you with greater efficiency and reduced risk.

Starting the Engine

Because of the risk of carbon monoxide poisoning, it makes good sense to start the mower outside; or at least in an open area with good ventilation.

Pump Bypass Valves



In order to move the mower from its storage area to a safe place to start it, you must open the pump bypass valves on each pump. Open each valve by turning it one turn counter clockwise. When you've moved the mower to its desired position, close each valve by turning it clockwise.

To avoid damaging the valves and their seals, do not open the valves more than two turns and do not over tighten the valves when closing them.

When the bypass valves are open, the normal braking action of the hydraulic system is bypassed. Never move the mower on slopes when the bypass valves are open. Always close both bypass valves when you are finished moving the mower.

The mower will not move under its own power unless both bypass valves are closed.

1. Pull the blade control lever to OFF. (The mower should not be started without the entire grass catcher, the mulching plug, or the guard in place.)
2. Pull both forward speed control levers to **NEUTRAL**.

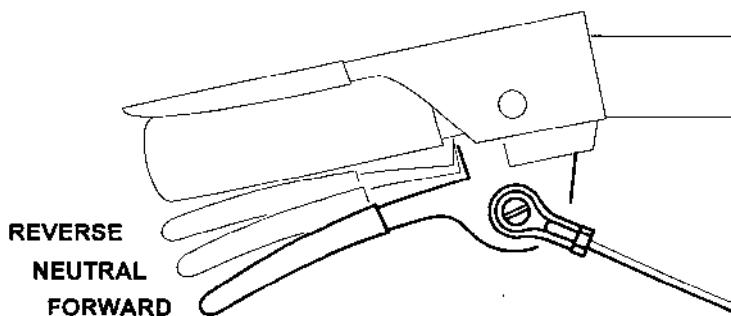
The safety interlock system will prevent the engine from starting if the blade control is ON or if the forward speed controls are not in neutral. (Do not attempt to disconnect or modify the safety interlock system.)
3. Squeeze both direction control levers to their neutral position and apply the neutral locks by pulling them back with your thumbs.
4. Be sure both pump bypass valves are closed.
5. Open the fuel valve.
6. Turn the key ON.
7. To start a cold engine, move the throttle lever to the **CHOKE** position.

To restart a warm engine, move the throttle lever to the **FAST** position.

8. When the engine warms up, move the throttle lever back to the **FAST** position for mowing, or the **SLOW** position to idle. For best engine performance, move the throttle lever out of **CHOKE** position as soon as the engine will run smoothly.

Using the Direction Controls

The direction control levers allow you to control the speed and direction of the mower.



The mower will quickly respond to the position of the levers. To avoid abrupt changes of direction, squeeze the levers slowly rather than treating them like a switch. Operate the mower with the forward speed control levers in their SLOW position until you are completely familiar with the sensitivity of the direction control levers.

The direction control levers are spring-loaded to their forward, or engaged, position. In this position the maximum speed of the mower is controlled by the forward speed control levers.

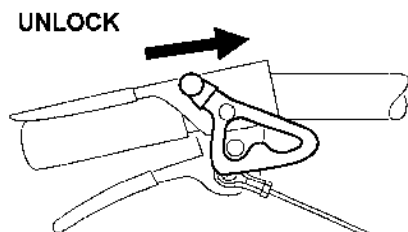
Moving Forward

1. Hold down one operator presence lever.

The safety interlock system will shut off the engine if you move the forward speed controls out of neutral unless one of the operator presence levers is held against the hand grip.

2. Move both forward speed control levers to the desired speed.

3. Slightly squeeze both direction control levers just enough to release the neutral locks by pushing them forward with your thumbs. If you squeeze the direction control levers too far, you will engage reverse. Squeeze them just far enough to release the neutral locks.



4. Slowly release pressure evenly on both direction control levers and the mower will move forward.

Steering the Mower

To steer the mower to the right, gradually squeeze the right-hand direction control lever. To steer the mower to the left, gradually squeeze the left-hand direction control lever.

The more you squeeze a direction control lever, the slower that wheel will turn and the sharper the turn will be.

Zero-radius turns (turns in which the mower has no forward or reverse motion — it just turns in place) are accomplished by squeezing one direction control lever into reverse while the other is in forward. Practice this maneuver at slow speeds until you become accustomed to the mower's responsiveness.

Stopping the Mower

To slow the mower, slowly squeeze both levers the same amount; the more you squeeze, the slower the mower will travel.

When you squeeze to the neutral position, the mower will stop. You may hold the mower stopped by engaging the neutral locks, pulling them rearward with your thumbs.

Remember that if you release the operator presence levers and the forward speed control levers are not in neutral, the safety interlock system will shut off the engine.

Reversing the Mower

To reverse the direction of the mower, squeeze the direction control levers toward the handgrips from the neutral position. The more you squeeze, the faster the mower will travel in reverse.

If the neutral locks are applied, when you release the direction control levers they will return to neutral. If the neutral locks are not applied, releasing the levers will result in the machine moving forward when the forward speed controls are not in neutral.

You may reverse the mower even when the forward speed controls are in neutral; their operation is independent of one another.

Be careful when operating the mower in reverse. Be aware of what is behind you. Be sure of your footing.

To steer to the right in reverse, squeeze the left direction control lever more. To steer to the left in reverse, squeeze the right direction control lever more.

Making an Emergency Stop

To make an emergency stop, release the hand grips. When you let go of the operator presence levers, the safety interlock system will stop the engine and the mower will come to a stop within 3 to 6 feet.

Starting to Mow

⚠ WARNING

Objects hidden in the lawn can be thrown by the mower blades.

Thrown objects can cause serious injury.

- Clear lawn of all debris before mowing.
- Do not operate the mower without either the discharge chute, mulching plug, or the entire grass catcher in place.
- Wear eye protection.
- Keep people and pets away.

For best cutting performance, always mow with the throttle lever in FAST position. To begin mowing:

1. Be sure the direction controls are locked in neutral.
2. Hold down one operator presence lever.
3. Move both ground speed control levers to the desired mowing speed. Always begin mowing with a slow ground speed. Increase the ground speed to match mowing conditions and your experience.
4. Slowly move the blade control lever to ON to start the blades rotating.
5. Slightly squeeze both direction control levers and release the neutral locks by pushing them forward with your thumbs.
6. Slowly release pressure on both direction control levers and begin mowing.

Adjusting your Speed

Adjust the forward speed controls to set your best mowing speed. If the mower does not travel in a straight path, you may move one of the ground speed control levers ahead of the other to make the mower track straight.

If the mower's path is drifting off to the right, move the right lever slightly ahead of the left lever. If the mower's path is drifting off to the left, move the left lever slightly ahead of the right lever.

You may also use this method to control your path when mowing on the side of a slope.

If the forward speed control knobs are separated by more than one inch, the safety interlock system will shut off the engine.

If the mower will not track in a straight path on level ground within this range, the tracking must be adjusted following the procedures on page 57.

Mowing Tips

Your mower is designed to trim closely on the left hand side and discharge clippings evenly on the right hand side.

For best cut quality, run the engine with the throttle lever in FAST.

Always mow in daylight, or under good artificial light.

Mowing on Slopes

There are two ways you can keep a straight path when mowing across slopes:

- Squeeze the direction control lever on the uphill side.
- Adjust the ground speed control levers as described in *Adjusting your Speed* (above).

Mow across slopes, not up and down. Avoid steep slopes (more than 20°), and be careful when changing direction.

When changing direction, always turn the mower up-slope. This will give you better control and help you maintain your balance.

Avoid abrupt changes of direction or speed when operating on slopes.

Avoid stopping on a slope. If you must stop on a slope, block the wheels securely if you leave the machine unattended. To start on a slope, keep the throttle at SLOW to help you avoid abrupt changes of direction.

Mowing on a slope when the grass is damp or wet could cause you to slip, fall, or lose control of the mower.

Parking the Mower

To stop the mower:

1. Squeeze both direction control levers to their neutral positions.
2. Engage the neutral locks by pulling rearward with your thumbs.
3. Pull both forward speed control levers to NEUTRAL.
4. Pull the blade control to OFF.
5. Move the throttle to SLOW and let the engine idle.
6. Turn the key off and remove it.
7. Turn the fuel valve OFF.

Try to park the mower on level ground. If you must park it on a slope, block the wheels to prevent it from rolling. Always remove the key when leaving the mower unattended to prevent children or unauthorized persons from operating it.

MAINTENANCE & ADJUSTMENTS

This section tells you how and when to perform normal maintenance and adjustments.

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The Importance Of Maintenance

Good maintenance is essential for safe, economical, and trouble-free operation. It will also help reduce air pollution.

To help you properly care for your mower, the following pages include a maintenance schedule, routine inspection procedures, and simple maintenance procedures using basic hand tools. Other service tasks that are more difficult, or require special tools, are best handled by professionals and are normally performed by a Honda technician or other qualified mechanic.

The maintenance schedule applies to normal operating conditions. If you operate the mower under unusual conditions, consult a servicing dealer for recommendations applicable to your individual needs and use.

Maintenance, replacement, or repair of the emission control devices and systems may be performed by any engine repair establishment or individual, using parts that are "certified" to EPA standards.

WARNING

Incorrect maintenance, or failure to correct a problem before operation, can cause a malfunction in which you can be seriously hurt or killed.

Always follow the inspection and maintenance recommendations and schedules in this owner's manual.

Maintenance Safety

Some of the most important safety precautions follow. However, we cannot warn you of every conceivable hazard that can arise in performing maintenance. Only you can decide whether or not you should perform a given task.

WARNING

Failure to properly follow maintenance instructions and precautions can cause you to be seriously hurt or killed.

Always follow the procedures and precautions in the owner's manual.

Safety Precautions

- Make sure the engine is off before you begin any maintenance or repairs. This will eliminate several potential hazards:
 - **Carbon monoxide poisoning from engine exhaust.** Be sure there is adequate ventilation whenever you operate the engine.
 - **Burns from hot parts.** Let the engine and exhaust system cool before touching.
 - **Injury from moving parts.** Do not run the engine unless instructed to do so.
- Read the instructions before you begin, and make sure you have the tools and skills required.
- To reduce the possibility of fire or explosion, be careful when working around gasoline. Use only a nonflammable solvent, not gasoline, to clean parts. Keep cigarettes, sparks, and flames away from all fuel-related parts.
- For certain operations, the mower must be raised off the ground. Be sure the mower is solidly supported before you put any part of your body under the mower.
- Wear heavy gloves when near the mower deck, belts, or blades.
- The mower uses pressurized oil to run the hydrostatic drive system. Make sure all connections are tight and all hoses and lines are in good condition before operating the mower.

Remember that your authorized Honda servicing dealer knows your mower best and is fully equipped to maintain and repair it.

To ensure the best quality and reliability, use only new, genuine Honda parts or their equivalents for repair and replacement.

Emission Control System

Source of Emissions

The combustion process produces carbon monoxide, oxides of nitrogen, and hydrocarbons. Control of hydrocarbons and oxides of nitrogen is very important because, under certain conditions, they react to form photochemical smog when subjected to sunlight. Carbon monoxide does not react in the same way, but it is toxic.

The U.S. and California Clean Air Act

EPA and California regulations require all manufacturers to furnish written instruction describing the operation and maintenance of emission control systems.

The following instructions and procedures must be followed in order to keep the emissions from your Honda engine within the emission standards.

Tampering and Altering

Tampering with or altering the emission control system may increase emissions beyond the legal limit. Among those acts that constitute tampering are:

- Removal or alteration of any part of the intake, fuel, or exhaust systems.
- Altering or defeating the governor linkage or speed-adjusting mechanism to cause the engine to operate outside its design parameters.

Problems that may Affect Emissions

If you are aware of any of the following symptoms, have your engine inspected and repaired by your authorized Honda servicing dealer.

- Hard starting or stalling after starting.
- Rough idle.
- Misfiring or backfiring under load.
- Afterburning (backfiring).
- Black exhaust smoke or high fuel consumption.

Proper Maintenance is the Owner's Responsibility

Replacement Parts

The emission control systems on your new Honda engine were designed, built, and certified to conform with EPA and California emission regulations. We recommend the use of genuine Honda parts whenever you have maintenance done. These original design replacement parts are manufactured to the same standards as the original parts, so you can be confident of their performance. The use of replacement parts that are not of the original design and quality may impair the effectiveness of your emission control system.

Maintenance

Follow the Maintenance Schedule on page 41. Remember that this schedule is based on the assumption that your machine will be used for its designed purpose. Sustained high-load or high-temperature operation, or use in unusually wet or dusty conditions, will require more frequent service.

Modification for High Altitude Operation

At high altitude, the standard carburetor air-fuel mixture will be too rich. Performance will decrease, and fuel consumption will increase. A very rich mixture will also foul the spark plug and cause hard starting.

High altitude performance can be improved by specific modifications to the carburetor. If you always operate your mower at altitudes above 1,800 meters (6,000 feet) have an authorized Honda commercial mower dealer perform this carburetor modification.

Even with the modification, engine horsepower will decrease about 3.5% for each 300 meter (1000 foot) increase in altitude. The effect of altitude on horsepower will be greater than this if no carburetor modification is made.

NOTICE

When the carburetor has been modified for high altitude operation, the air-fuel mixture will be too lean for low altitude use. Operation at altitudes below 1,800 meters (6,000 feet) with a modified carburetor may cause the engine to overheat and result in serious engine damage. For use at low altitudes, have an authorized servicing dealer return the carburetor to original factory specifications.

Maintenance Schedule

	Item	Interval	Before Every Use	Every 25 Hours	Every 50 Hours	Every 100 Hours	Every 300 Hours	Every 1000 Hours
	Blades	Check	•					
		Check bolt torque			•			
§	Engine Oil	Check	•					
		Change		*		•		
	Engine Oil Filter	Replace					• ¹	
§	Air Cleaner	Check	•					
		Service			• ¹			
		Replace					• ²	
§	Spark Plug	Check				•		
		Replace	Every 300 hours or 1 year					
§	Spark Arrester (optional part)	Clean				•		
§	Valve Clearance	Adjust					•	
§	Fuel Filter	Replace					•	
§	Fuel Line	Check				•		
		Replace	Every 3 years					
	Hydrostatic Oil	Check	•					
		Change			*			•
	Hydrostatic Filter	Replace			*			•
	Lubrication Points	Lubricate		•				
	Belts	Check	•					
		Adjust			•			
	Blade brake	Check	•					
		Adjust			•			
	Tires	Check	•					

§ Emissions related item.

* Perform initial service at this time.

•¹ Service more frequently when used in dusty conditions.

•² Replace paper element only.

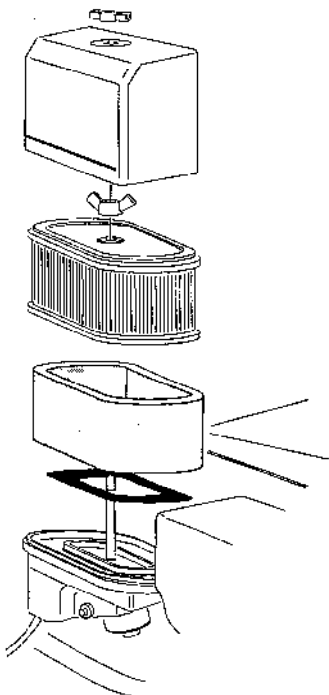
Tuneup Specifications

ITEM	SPECIFICATION	PAGE
Spark plug gap	0.7 - 0.8 mm (0.028 - 0.032 in)	44
Carburetor idle speed	1750 ± 200 rpm	46
Valve clearance (cold)	IN 0.08 - 0.12 mm EX 0.13 - 0.17 mm	45
Other specifications	No other adjustments needed.	

Air Cleaner

Check that the air cleaner elements are clean and in good condition. A dirty air cleaner will restrict air flow to the engine, reducing performance. A damaged air cleaner will allow dirt to enter the engine, causing rapid engine wear.

1. Remove the wing nut to remove the air cleaner cover. If the foam element appears clean over more than half its surface, it does not need cleaning. Reinstall the cover. If the foam element appears dirty, go to Step 2.
2. Remove the other wing nut and remove the elements.
3. Separate the foam element from the paper element and carefully check each one for holes or tears. Replace any damaged element.
4. Clean the foam element by squeezing it in warm soapy water, rinsing it, and allowing it to dry. You may also use a nonflammable solvent and then allow it to dry.



⚠ WARNING

Gasoline is highly flammable and explosive.

You can be burned or seriously injured.

Never use gasoline to clean engine parts. Use a nonflammable solvent.

5. Oil the foam element by dipping it in clean engine oil and squeezing out all excess oil. If too much oil is left in the foam, the engine will smoke when you first start it.

6. Clean the paper element by tapping it on a hard surface to knock off dirt or by blowing compressed air (at less than 207 kPa {30 psi}) through the filter from the inside. Never try to brush off the dirt — that will just force it into the filter fibers.
7. Use a damp rag to wipe any dirt from the inside of the air cleaner housing and cover. Be careful not to allow dirt into the duct leading to the carburetor. Be sure the rubber seal in the base is in place and in good condition.
8. Place the foam element over the paper element and install them with the wing nut.
9. Install the cover with its wing nut.

NOTICE

Operating the engine with no air cleaner or with damaged elements can cause rapid engine wear.

Fuel

Fuel tank capacity: 16.7 liters, 4.4 gallons

Refueling

Remove the cap on the tank and check the fuel level. Refuel carefully to avoid overfilling or spilling fuel. There should be no fuel in the filler neck.

⚠ WARNING

Gasoline is highly flammable and explosive.

You can be burned or seriously injured.

When refueling:

- Stop engine and keep heat, sparks, and flame away.
- Refuel only outdoors.
- Wipe up spills immediately.

Never refuel the mower inside a building where fumes may reach an open flame or spark. Keep gasoline away from appliance pilot lights, electric motors, etc.

Refuel in a well-ventilated area before starting the engine. If the engine has been running, allow it to cool. Avoid overfilling the tank or spilling fuel.

Spilled fuel not only creates a fire hazard, it can cause environmental damage. Wipe up spills immediately. Dispose of gasoline properly.

Fuel Recommendation

Use unleaded gasoline with a pump octane rating of 86 or higher.

This engine is certified to operate on unleaded gasoline. Unleaded gasoline produces fewer engine and spark plug deposits and extends exhaust system life.

Never use stale or contaminated gasoline or oil/gasoline mixtures. Avoid getting dirt or water in the fuel tank.

Occasionally, you may hear light "spark knock" or "pinging" (a metallic rapping noise) when operating under heavy loads. This is no cause for concern.

If spark knock or pinging occurs at a steady engine speed, under normal load, the engine can be damaged. Try using fresh gasoline in the tank or change brands of gasoline. If spark knock or pinging persists, contact your authorized Honda Commercial Mower dealer.

Running the engine with persistent spark knock or pinging can cause engine damage. This type of damage is not covered by the Distributor's Limited Warranty.

Oxygenated Fuels

Some conventional gasolines are being blended with alcohol or an ether compound. These gasolines are collectively referred to as *oxygenated fuels*. To meet clean air standards, some areas of the United States and Canada use oxygenated fuels to help reduce emissions. If you use an oxygenated fuel, be sure it is unleaded and meets the minimum octane rating requirement.

Before using an oxygenated fuel, try to confirm the fuel's contents. Some states and provinces require this information to be posted on the pump. The following are the EPA approved percentages of oxygenates:

- Ethanol (ethyl or grain alcohol) 10% by volume

You may use gasoline containing up to 10% ethanol by volume. Gasoline containing ethanol may be marketed under the name "Gasohol".

- MTBE (methyl tertiary butyl ether) 15% by volume

You may use gasoline containing up to 15% MTBE by volume.

- Methanol (methyl or wood alcohol) 5% by volume

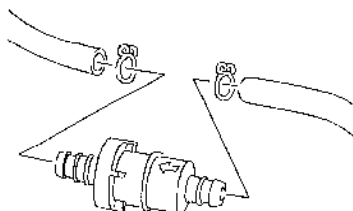
You may use gasoline containing up to 5% methanol by volume as long as it also contains cosolvents and corrosion inhibitors to protect the fuel system. Gasoline containing more than 5% methanol by volume may cause starting and/or performance problems. It may also damage metal, rubber, and plastic parts of your fuel system. If you notice any undesirable operating symptoms, try another service station or switch to another brand of gasoline.

Fuel system damage or performance problems resulting from the use of an oxygenated fuel containing more than the percentages of oxygenates mentioned above are not covered under warranty.

Changing the Fuel Filter

Change the fuel filter at the recommended interval.

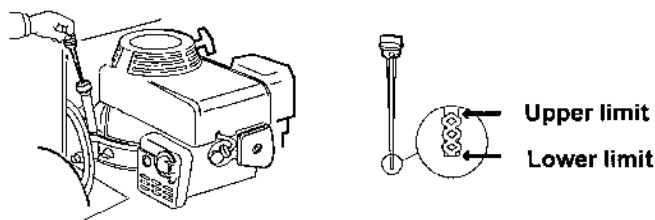
1. Clamp off the fuel line between the fuel tank and the filter to prevent fuel flow. Use a small locking pliers, hemostat, or other device.
2. Place a container under the filter to catch any spilled fuel.
3. Squeeze the hose clamps and remove the lines from the filter.
4. Install the new filter with the arrow pointing toward the engine.
5. Be sure the clamps securely hold the fuel lines to the new filter.
6. Dispose of the old filter and any spilled fuel properly and remove the clamping device from the fuel line.
7. Check for leaks.



Engine Oil

Engine Oil Capacity: 1.1 liters, 1.2 US quarts

Checking the Level



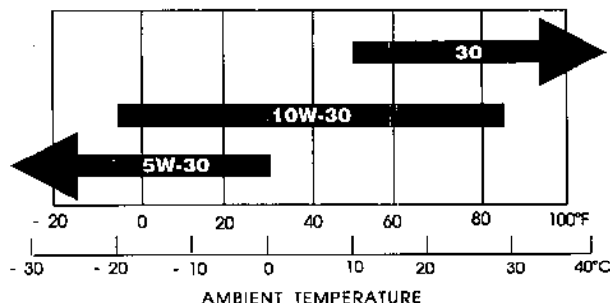
1. Clean the area around the oil filler cap, remove it, and wipe the dipstick with a clean cloth.
2. Insert the dipstick without screwing it into the filler neck. Remove the dipstick and check the oil level on it.
3. If the oil level is low (near the bottom of the dipstick), add enough oil to bring the level to the upper mark on the dipstick.

Running the engine with a low oil level will cause engine damage.

Recommended Oil

Use a high-detergent, premium quality 4-stroke engine oil certified to meet API Service Classification SF, SG or equivalent.

SAE 10W-30 is recommended for general, all-temperature use. Other viscosities shown in the chart may be used when the average temperature in your area is within the indicated range.

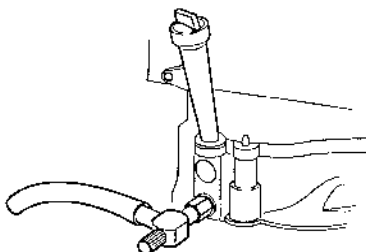


Changing the Engine Oil

Change the oil at the recommended interval or more frequently under extreme operating conditions.

Drain the oil while the engine is warm to assure rapid and complete draining.

1. Install one end of a section of $\frac{1}{2}$ " hose over the drain outlet and place the other end in a suitable container to catch the used oil.
2. Clean the area around the oil filler cap and remove it.
3. Turn the drain valve counterclockwise about 4 turns to open it. Do not open the valve more than 6 turns to avoid damaging the seals.
4. When the oil has drained, turn the valve clockwise to close it and remove the section of hose. To avoid damaging the valve, do not over tighten it.
5. Refill the engine with the correct amount of the recommended oil.
6. After running the engine, recheck the oil level and adjust if necessary.



Used engine oil contains substances that have been identified as carcinogenic. If repeatedly left in contact with the skin for prolonged periods, it may cause skin cancer. Wash your hands thoroughly with soap and water as soon as possible after contact with used oil.

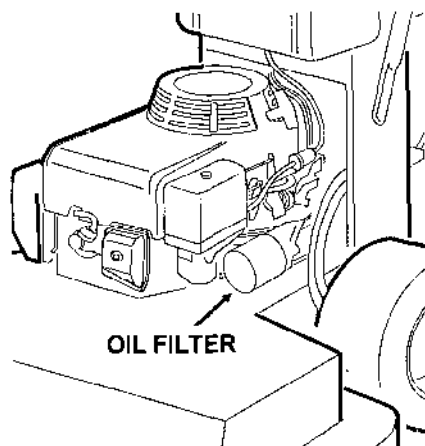
Please dispose of used engine oil and the oil containers in a manner that is compatible with the environment. We suggest you take it in a sealed container to your local recycling center or service station for reclamation. Do not throw it in the trash or pour it on the ground or down a drain.

Changing the Engine Oil Filter

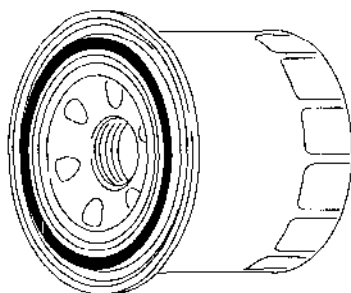
1. Drain the engine oil.
2. Remove the oil filter and let the remaining oil drain out.

Correctly dispose of the old oil filter.

3. Clean the filter base with a clean cloth.
4. Coat the O-ring of the new filter with clean engine oil.
5. Hand tighten the oil filter until the O-ring seats against the filter base.



6. Tighten the filter by hand an additional $\frac{3}{4}$ - 1 turn.
7. Pour the specified amount of oil into the engine. Run the engine for a few minutes and check for leaks in the area of the filter base.
8. Stop the engine and check the oil level. Adjust if necessary.



A Honda oil filter wrench will simplify the removal and installation of the filter. The wrench, P/N 07912-6110001, is available from your authorized Honda servicing dealer.

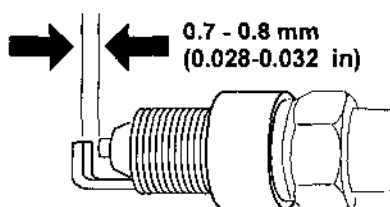
Spark Plug

Recommended Types

NGK BPR5ES
ND W16EPR-U

NOTICE

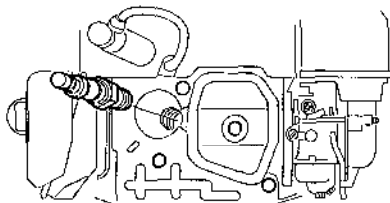
Spark plugs of the wrong size or incorrect heat range can cause engine damage.



Checking the Spark Plug

For good performance, the spark plug should have the correct gap and be free of deposits.

1. Disconnect the spark plug cap and remove any dirt from around the spark plug area.
2. Remove the spark plug with a $\frac{13}{16}$ inch spark plug wrench.
3. Inspect the spark plug for excessively worn electrodes, chips or cracks in the insulator, or excessive deposits. Replace the spark plug if you have any doubts about its condition.
4. Measure the electrode gap with a wire gap gauge. Adjust the gap to 0.7 - 0.8 mm (0.028 - 0.031 in) by bending the side electrode.
5. Install the plug carefully, by hand, to avoid cross threading.
6. Use a spark plug wrench to tighten the plug enough to compress the washer. For a used plug, tighten $\frac{1}{8}$ to $\frac{1}{4}$ of a turn after the spark plug seats. For a new plug, tighten $\frac{1}{2}$ turn after the spark plug seats.



A loose spark plug can become hot enough to damage the engine. Over tightening a spark plug can damage the threads in the engine.

7. Install the spark plug cap on the plug.

Valve Clearance

Adjust the valves at the recommended interval.

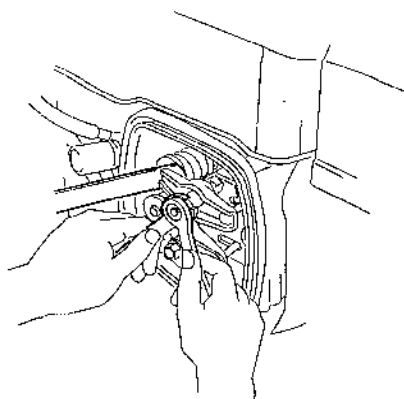
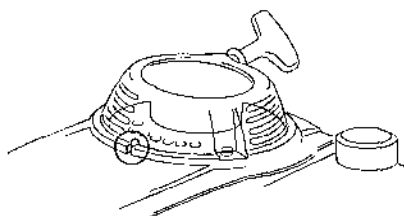
Valve clearance inspection and adjustment must be done with the engine cold.

1. Remove the valve cover.
2. Set the piston at top dead center of the compression stroke (both valves will be fully closed). The cutout mark in the starter pulley will align with the index mark on the fan cover when the piston is at top dead center of either the compression or exhaust stroke.
3. Measure the clearance between the rocker arm and the valve with a feeler gauge.

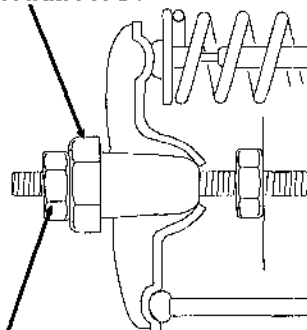
INTAKE 0.08 - 0.12 mm
(0.003 - 0.005 in)

EXHAUST 0.13 - 0.17 mm
(0.005 - 0.007 in)

4. To adjust valve clearance, hold the rocker arm pivot and loosen the pivot lock nut.
5. Turn the rocker arm pivot to obtain the specified clearance.
6. Hold the rocker arm pivot and tighten the pivot lock nut.
7. Recheck the clearance and readjust if necessary.
8. Install the valve cover.



ROCKER ARM PIVOT



PIVOT LOCK NUT

Carburetor

Perform this adjustment if the idle is slow or rough and you're sure the air cleaner and spark plug are in good condition.

Start the engine in an area with adequate ventilation to avoid carbon monoxide poisoning. Allow the engine to warm to normal operating temperature.

With the throttle lever at SLOW, turn the throttle stop screw to set the idle speed.

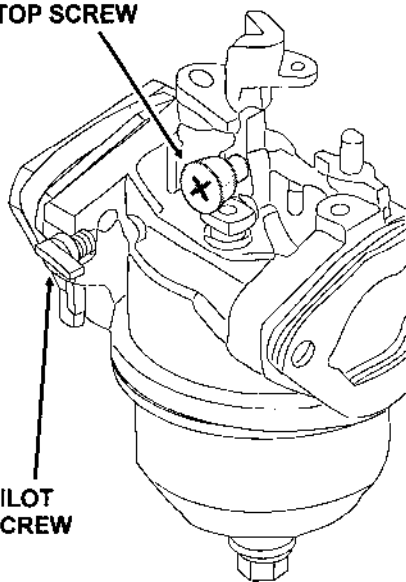
IDLE SPEED

1750 ⁺²⁰⁰₋₀ rpm

The pilot screw is fitted with a limiter cap to prevent excessive enrichment of the fuel-air mixture. Do not attempt to remove the limiter cap. It cannot be removed without breaking the pilot screw.

THROTTLE
STOP SCREW

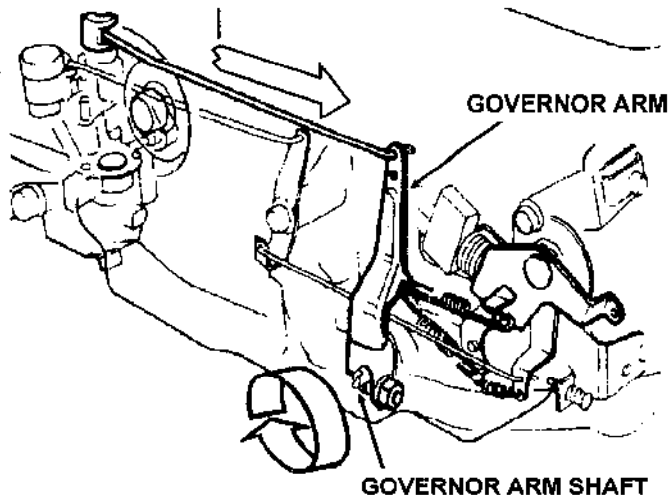
PILOT
SCREW



Governor Linkage

It's not likely that this adjustment will change by itself. Perform this procedure only when the engine doesn't reach its maximum no-load speed and you are sure that the engine is correctly tuned (good spark plug, clean air cleaner, etc.).

1. Loosen, but do not remove, the nut on the governor arm pinch bolt.
2. Move the governor arm rearward to fully open the throttle and hold it in this position.
3. Rotate the governor arm shaft fully clockwise and hold it there with a pair of pliers.



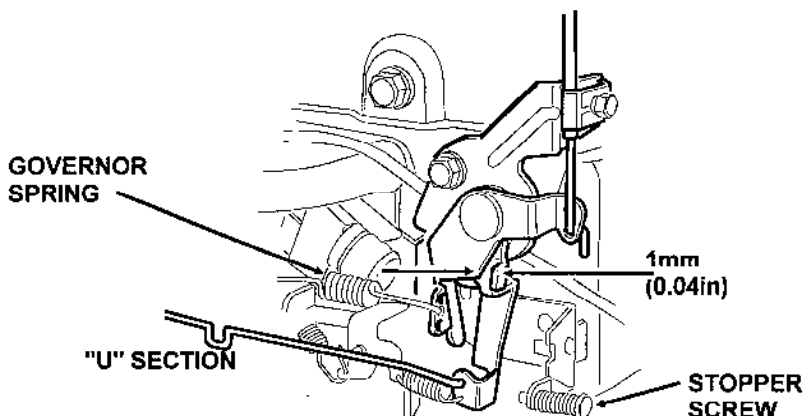
4. Tighten the nut on the governor arm pinch bolt to 11 N•m (8.0 ft-lb) to secure the arm to the shaft.
5. Start the engine and allow it to warm to normal operating temperature.
6. With the throttle in FAST, the engine should be at its maximum governed speed.

MAXIMUM NO-LOAD SPEED 3550 \pm 50 rpm

If the no-load speed is not within the limits, adjust the throttle cable.

Throttle Cable

In normal use, cables will lose their adjustment. Perform this procedure if the no-load speed is not within limits or the engine does not seem to respond correctly to throttle lever movements.



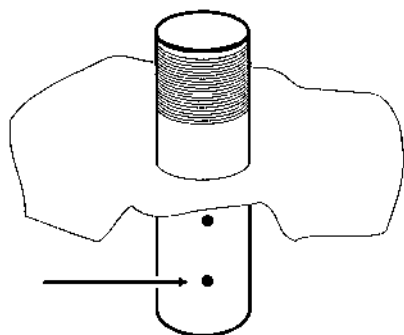
1. Set the throttle lever to FAST.
2. On the engine, check the clearance between the control lever and the choke lever. It should be 1 mm (0.04 in) or less. In other words, just touching. The choke should be fully open.
3. If you need to adjust the clearance, loosen the cable holder and adjust the position of the cable housing.
4. Next, set the throttle lever to CHOKE.
5. Check that the choke valve on the carburetor is fully closed. If it isn't, bend the "U" section of the choke rod.
6. Adjust the stopper screw so that it just contacts the choke lever when the choke is fully closed.
7. Check maximum engine speed.

Hydrostatic Oil

Hydrostatic Oil Capacity: 9.8 liters, 10.4 quarts

Checking the Level

1. Remove the cap on the reservoir.
2. The oil level should be even with the lower hole. Add oil to bring it to the correct level.



Oil Recommendation

SAE 10W-40 engine oil meeting or exceeding API Service Classification SG.

Changing the Oil

Change the oil at the recommended interval or more frequently under extreme operating conditions.

Drain the oil while it is warm to assure rapid and complete draining.

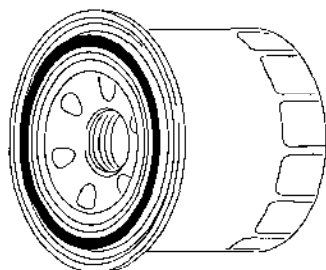
1. Install one end of a section of $\frac{1}{2}$ inch hose over the drain outlet and place the other end in a suitable container to catch the used oil.
2. Clean the area around the oil filler cap and remove it.
3. Turn the drain valve counterclockwise about 4 turns to open it. Do not open the valve more than 6 turns to avoid damaging the seals.
4. When the oil has drained, turn the valve clockwise to close it and remove the section of hose. To avoid damaging the valve, do not over tighten it.
5. Refill the reservoir with the correct amount of the recommended oil.
6. Start the engine and allow it to idle for 3 to 5 minutes to circulate the oil and allow any trapped air to escape.
7. Stop the engine and recheck the oil level.

Changing the Hydrostatic Oil Filter

1. Drain the reservoir.
2. Remove the oil filter with a filter wrench and let the remaining oil drain out.

Correctly dispose of the old oil filter.

3. Clean the filter base with a clean cloth.
4. Coat the O-ring of the new filter with clean oil.
5. Hand tighten the oil filter until the O-ring seats against the filter base.
6. Tighten the filter by hand an additional $\frac{3}{4}$ – 1 turn.



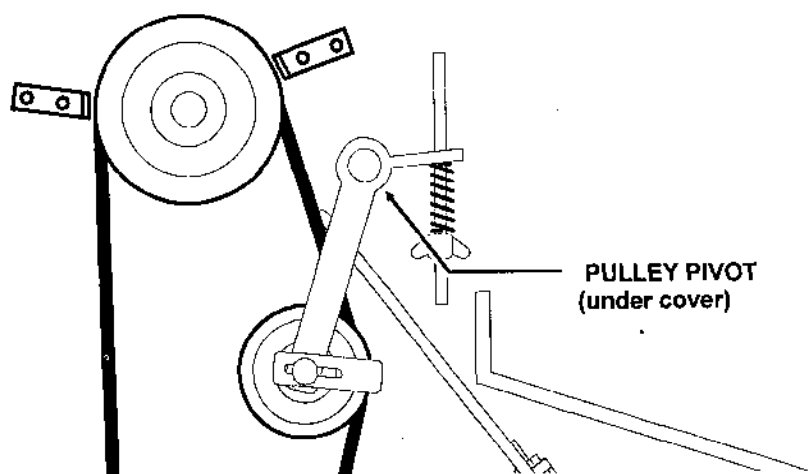
7. Refill the reservoir with the correct amount of the recommended oil.
8. Start the engine and allow it to idle for 3 to 5 minutes to circulate the oil and allow any trapped air to escape.
9. Stop the engine and recheck the oil level.

Lubrication Points

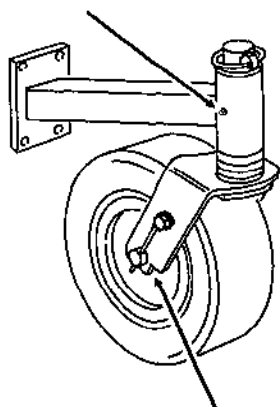
Grease: NGLI #2 Lithium Base EP

Follow the diagrams on the next page to lubricate these fittings.

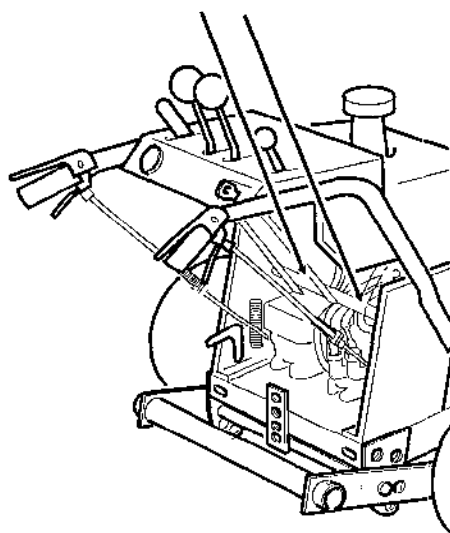
- Caster wheels (2)
- Caster pivots (2)
- Pulley pivots (1)
- Forward speed control shaft (2)



CASTER PIVOTS



**FORWARD SPEED
CONTROL SHAFT**



Control Linkage Adjustment

If any of the following conditions are noticed, the control linkage must be adjusted.

- Mower creeps when the direction control levers are positioned in neutral with the neutral locks.
- Mower creeps when the forward speed control levers are in neutral.
- Mower will not track straight when the forward speed control levers are even.

Before beginning the adjustment procedure, check the tires for correct inflation and even wear. Worn or incorrectly inflated tires can cause tracking problems. Check the hydrostatic oil level. Operate the mower to bring the hydrostatic oil up to operating temperature.

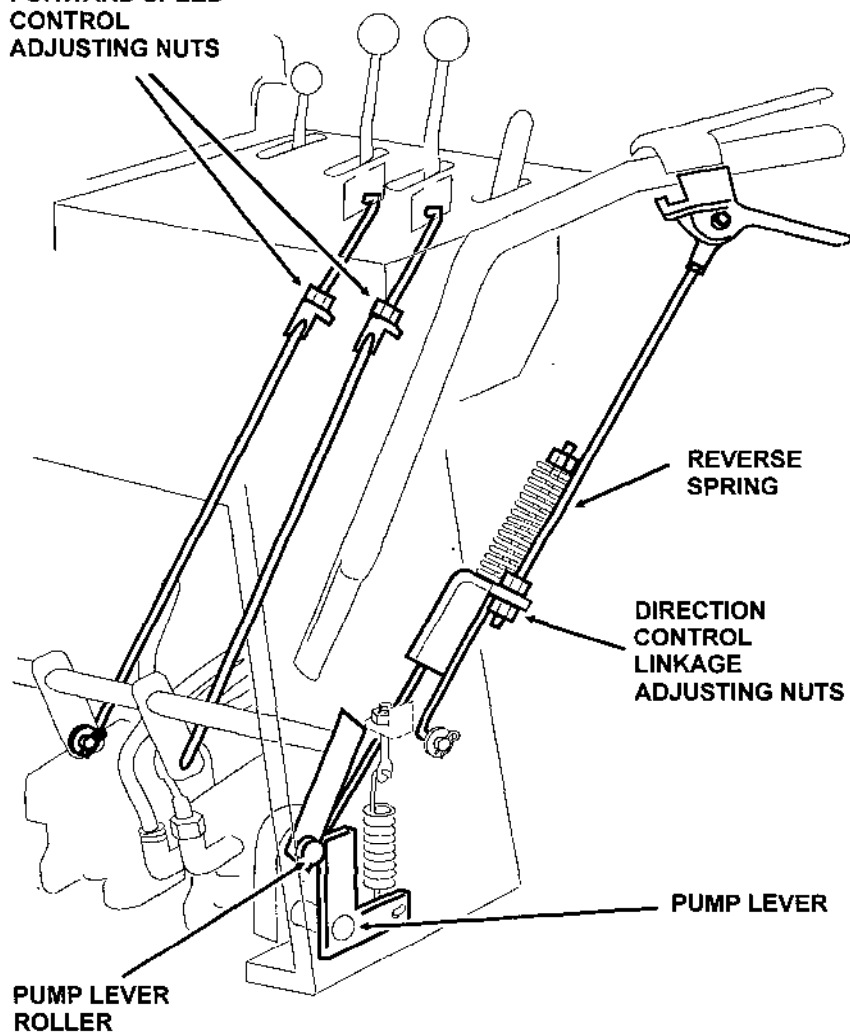
At times during this adjustment procedure, you must run the engine. Be sure there is adequate ventilation.

Direction Control Linkage Adjustment

Perform this adjustment if the mower creeps when the direction control levers are locked in neutral with the neutral locks.

1. Raise and support the rear of the mower so that the rear wheels are clear of the ground.
2. Lock the direction control levers in neutral with the neutral locks.
3. Move the forward speed control levers full forward so that the rollers do not contact the pump levers.
4. Adjust the direction control linkage on each side so that the control arms on the side of each pump are vertical.
5. Hold an operator presence lever down on the hand grip for the length of this procedure.
6. Start the engine and move the throttle lever to FAST.
7. Loosen the locknuts and adjust the direction control linkage on each side so that the wheels do not rotate. Lengthening the rod causes forward wheel rotation; shortening the rod causes rearward wheel rotation.

FORWARD SPEED CONTROL ADJUSTING NUTS



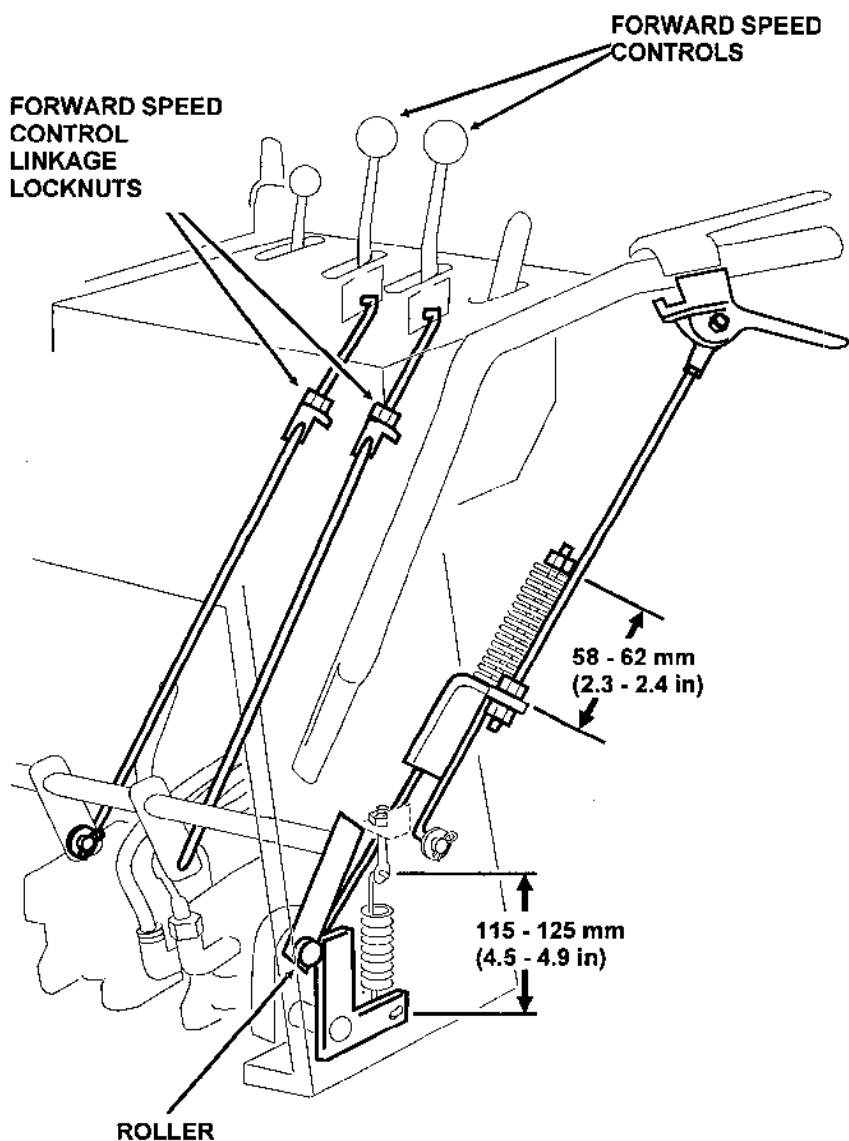
- Turn the adjusting nut to lengthen the rod until forward rotation just starts.
 - Turn the adjusting nut, counting the number of turns, to shorten the rod until rear rotation just starts.
 - Turn the adjusting nut to lengthen the rod one-half the number of turns you counted.
8. Tighten the locknut. Adjust the linkage on the other side in the same manner.

9. Release the neutral locks and cycle the direction control levers forward and backward several times. Engage the neutral locks and be sure the wheels come to a complete stop. Readjust the linkage if necessary.
10. With the neutral locks engaged, adjust both reverse springs to a length of 58 - 62 mm (2.3 - 2.4 in).

Speed Control Linkage Adjustment

Perform this adjustment if the mower creeps when the speed control levers are in neutral and the neutral locks are released.

1. Raise and support the rear of the mower so that the rear wheels are clear of the ground.
2. Pull the forward speed control levers into neutral and engage the neutral locks on the direction control levers.
3. Loosen the locknuts on the forward speed linkage.
4. Adjust the length of the rod until the roller just contacts the pump control arm with no slack in the linkage. Adjust the other side the same way.
5. Start the engine, move the throttle lever to FAST, and release the neutral locks.
6. Adjust each forward speed linkage rod:
 - Turn the adjusting nut to lengthen the rod until forward rotation just starts.
 - Turn the adjusting nut, counting the number of turns, to shorten the rod until rear rotation just starts.
 - Turn the adjusting nut to lengthen the rod one-half the number of turns you counted.
7. Tighten the locknut. Adjust the linkage on the other side in the same manner.
8. Adjust both pump arm springs to a length of 115 - 125 mm (4.5 - 4.9 in).
9. Cycle the forward speed control levers from neutral to full forward a number of times. Readjust the linkage to stop any wheel rotation in neutral.



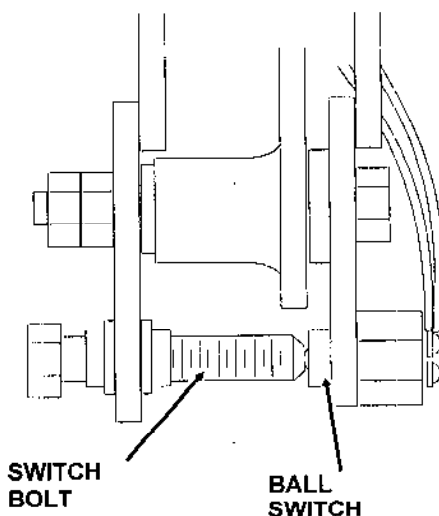
Tracking Adjustment

Perform this adjustment if the mower will not track straight with the speed control levers evenly positioned. Adjust the speed control linkage before performing this adjustment.

1. Raise and support the rear of the mower so that the rear wheels are clear of the ground.
2. Release the neutral locks and put the forward speed control levers in neutral.
3. Start the engine.
4. Hold an operator presence lever down on the hand grip for the length of this procedure.
5. Watch the rear wheels while you slowly move both speed control levers forward (keeping them even):
 - Both wheels should begin turning at about the same time.
 - When the levers are both positioned about one inch forward of neutral, both wheels should rotate at about the same speed.
6. Adjust the speed control rod lengths *slightly* if necessary:
 - Lengthening the rod slightly will increase wheel speed and cause the wheel to begin to rotate sooner.
 - Shortening the rod slightly will decrease the wheel speed and cause the wheel to begin to rotate later.
7. Tighten the locknuts and be sure that the wheels don't rotate when the levers are in neutral.
8. Operate the mower on level ground to be sure that it tracks straight when the levers are even. Readjust the rods slightly if necessary. Be sure that the mower doesn't creep when the speed control levers are in neutral.

Speed Control Switch Adjustment

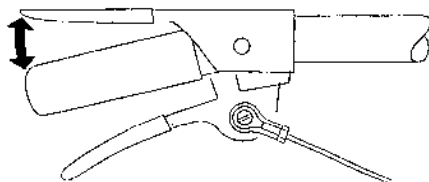
1. Adjust the switch bolt on the left forward speed control lever so that there is 0.5 - 1.0 mm (0.02 - 0.04 in) clearance between the end of the switch bolt and the housing of the ball switch on the right forward speed control lever. When the knobs of the forward speed control levers are even, the ball in the switch should be depressed and the bolt should be centered on the ball.



Operator Presence Lever Operation

1. Start the engine and move the forward speed control levers forward out of neutral.

Slowly release each operator presence lever, one at a time. It should stop the engine and the lever should touch the hand grip.



Tires

Front Tire Pressure: 103 kPa (28 psi)

Rear Tire Pressure: 193 kPa (15 psi)

Incorrect tire inflation can cause the mower not to track in a straight path.

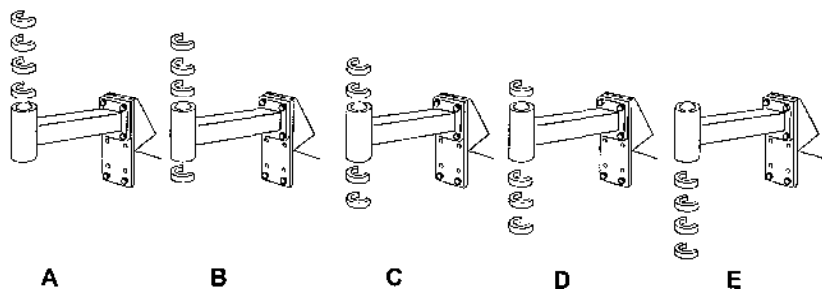
Replace the tires when the tread is worn. Worn-out tires will not provide good traction, especially on slopes and uneven ground.

Cutting Height

The cutting height of your mower can be easily adjusted within two ranges: a low range of 38 mm to 89 mm (1½ - 3½ in), and a high range of 89 mm to 140 mm (3½ - 5½ in). Your Honda dealer assembled your mower with the wheels in the most common range for your area. If you need to change the range, follow the procedures in Cutting Range on page 65.

Always shut off the engine and remove the key before adjusting cutting height.

Be sure to adjust both the front and rear wheels to the same cutting height to get the best performance and cut quality.



Front Wheel Adjustment

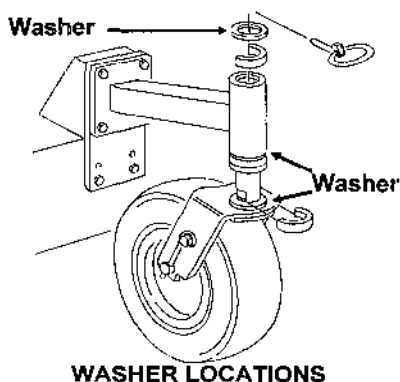
The front caster wheels are adjustable within their range in increments of 13 mm (½ in) by changing the position of the four spacers on each caster post. The following table shows the position of the spacers for the various cutting heights.

Shim Location	Low Range Cutting Height	High Range Cutting Height
A	38 mm (1½ in)	89 mm (3½ in)
B	51 mm (2 in)	102 mm (4 in)
C	64 mm (2½ in)	114 mm (4½ in)
D	76 mm (3 in)	127 mm (5 in)
E	89 mm (3½ in)	140 mm (5½ in)

To change the spacers:

1. Raise and support the front of the mower deck.

2. Remove the pin and lower the caster post about 6 mm ($\frac{1}{4}$ inch) until the spacer can be removed over the flats in the caster post.
3. Position the spacers in the desired locations.
4. Raise the caster post and insert and lock the pin.
5. Repeat the procedure on the other caster wheel.

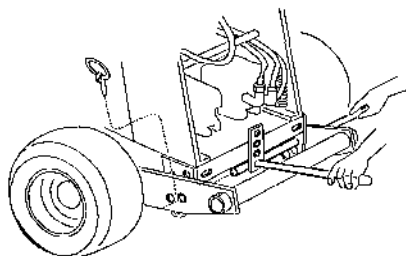
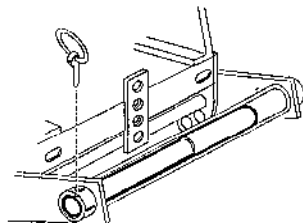


Do not change the location of the washers on the caster post.

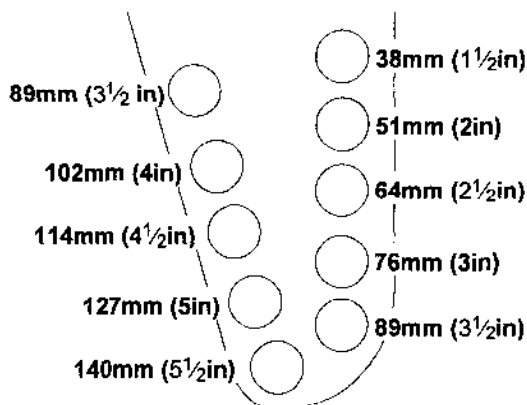
Rear Wheel Adjustment

The rear wheels are adjustable within their range in 13 mm ($\frac{1}{2}$ in) increments by placing the adjusting bar in the drive axle in one of the 5 holes on the power unit. The adjusting lever helps you raise and lower the power unit.

1. Remove the linchpin to remove the adjusting lever from its storage position.
2. Remove the linchpin from one or the other ends of the adjusting bar.
3. Place the adjusting lever in one of the holes on the power unit to raise the power unit until the adjusting bar can be removed.



4. Use the adjusting lever to align the holes in the desired position and install the adjusting bar. (If you are adjusting from one end of the range to the other, you may have to install the adjusting bar in an intermediate position to relocate the adjusting lever for better leverage.)



5. Install the linchpin(s) in the adjusting bar. Place the adjusting lever in its storage position and secure it with its spring pin.

Cutting Range

To change the cutting range of your mower, reposition the front caster wheels on the mower deck and change the drive axle pivot position on the power unit.

Always shut off the engine and remove the key before changing the cutting range.

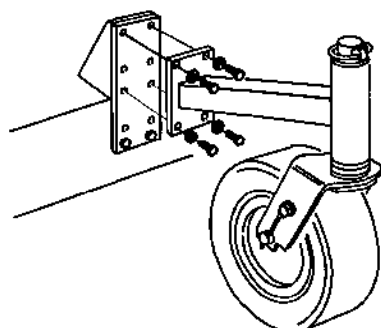
Front Cutting Range Adjustment

1. Raise and support the front of the mower deck.
2. Remove the 4 bolts holding the caster wheel assembly to the mower deck.
3. Reinstall the caster wheel assembly in the alternate set of holes.

Upper 4 holes = Low Range.

Lower 4 holes = High Range

4. Repeat the procedure for the other caster wheel and lower the deck to the ground.
5. Tighten the 4 bolts on each caster wheel assembly to 42 N•m (31 ft-lb).

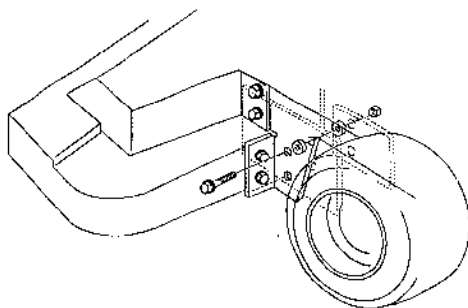


(LOW RANGE SHOWN)

6. Follow the procedures for Front Wheel Adjustment (page 63) to set the desired cutting height.
7. Lower the mower deck to the ground.

Rear Cutting Range Adjustment

1. Open the pump bypass valves on both pumps.
2. Raise and support the rear of the power unit so that the rear wheels clear the ground by about 3 inches.
3. Follow the procedures for Rear Wheel Adjustment to remove the adjusting bar and lower the wheels to the ground.
4. Remove the nut from the pivot bolt on each side of the axle assembly and remove the pivot bolts.
5. Roll the wheels to align the pivot hole on the axle assembly with the alternate pivot holes in the power head.
6. Install the pivot bolts and tighten the nuts on the pivot bolts to 103 N•m (76 ft-lb).
7. Follow the procedures for Rear Wheel Adjustment (page 64) to set the desired cutting height.
8. Tighten the wheel nuts to 47 N•m (35 ft-lb).
9. Lower the power unit to the ground.
10. Close both pump bypass valves.



(LOW RANGE POSITION SHOWN)

Be sure to adjust both the front and rear wheels to the same cutting height to get the best performance and cut quality.

Blades

It is important for your safety and the safety of others that you inspect the blades for condition and correct installation before operating the mower.

⚠ WARNING

A worn, cracked, or damaged blade can break and pieces of the broken blade can become dangerous projectiles.

Thrown objects can cause serious injury.

Inspect the blades regularly and do not operate the mower with a worn or damaged blade.

The blades are subject to wear during normal operation and should be inspected regularly.

If a blade strikes an object, it may be damaged. Immediately stop the mower and inspect the blades.

Before working on or around the blades, disconnect the spark plugs connectors from the spark plugs. This will prevent the engine from starting inadvertently.

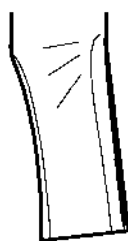
Always wear heavy gloves to protect your hands when working with or near the mower blades.



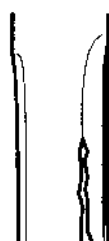
NEW



WORN



BENT



CRACKED

Inspecting the Blades

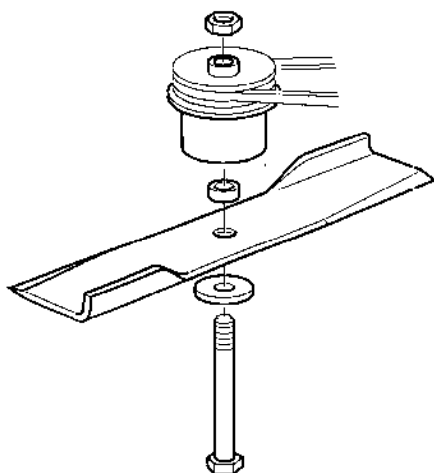
1. Turn the ignition switch key OFF and remove the key from the switch.
2. Move the blade control lever OFF.
3. Raise and support the front of the mower deck.

4. Inspect each of the blades for cracking, bending, deep nicking, and wear.

If any of the blades show signs of damage or excessive wear, remove the blades for a more thorough inspection.

Removing the Blades

1. Turn the ignition switch key OFF and remove the key from the switch.
2. Move the blade control lever OFF
3. Remove the belt cover by removing the wing nuts.
4. Raise and support the front of the mower deck
5. Remove the nut from the spindle bolt.
6. Remove the spindle bolt, washer, blade, and spacer.
7. Repeat the procedure for the other blade(s).



Installing the Blades

1. Reinstall the blades by placing a washer, blade, and spacer on the spindle bolt.
2. Insert the spindle bolt up through the spindle.
3. Install the nut on the spindle bolt. Tighten to 88 - 102 N•m (65 - 75 ft-lb) torque.
4. Repeat the procedure for the other blade(s).
5. Lower the mower deck to the ground.
6. Install the belt cover with the wing nuts.

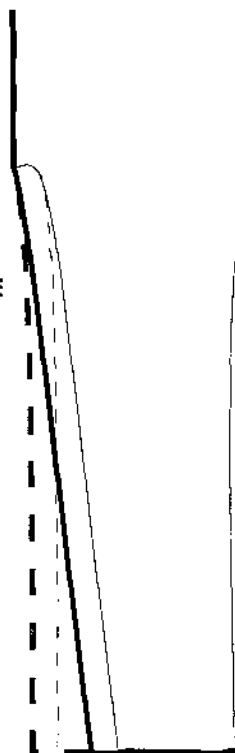
Servicing the Blades

A dull blade may be sharpened, but a blade that is worn out, bent, cracked, or otherwise damaged must be replaced. Always use genuine Honda replacement blades. Substitute blades may not meet Honda specifications and may be dangerous.

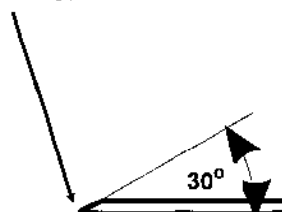
To sharpen a blade:

- Maintain the original angle of the blade (about 30°).
- Leave a blunt edge of 1 mm ($\frac{1}{16}$ - $\frac{1}{32}$ in). Do not sharpen to a knife edge.
- Remove an equal amount of material from each end of the blade to maintain balance.
- Do not remove material from the inner area of the cutting edge. If you need to remove material to restore the cutting edge, taper the edge toward the tip. Do not taper beyond $\frac{1}{3}$ of the blade width.
- Do not grind the back side of the blade.
- Check the balance of the blade by placing a dowel through the mounting hole. The blade should remain horizontal. If one end drops, remove additional material from it to make it lighter and recheck the balance.

TAPER THE
CUTTING
EDGE



BLUNT EDGE



Deck Belt Adjustment and Replacement

Replace the deck belt if it is worn, frayed, or glazed. You will need to remove the deck belt to replace the pump belt and disconnect it to replace the blade belt. Whenever you remove and replace the deck belt, check the adjustment of the belt guides, blade control linkage, and the blade brake.

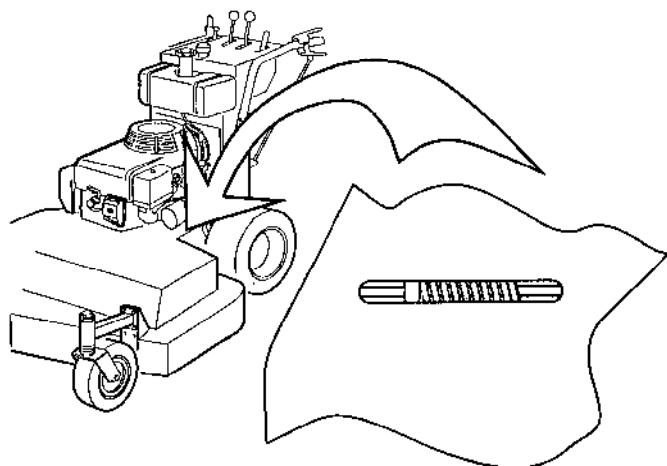
⚠ WARNING

Moving belts and pulleys can cause serious injuries.

Do not operate engine with the belt cover removed.

Before removing belt cover for maintenance, remove key from ignition switch and disconnect the spark plug lead.

Adjust Belt Tension

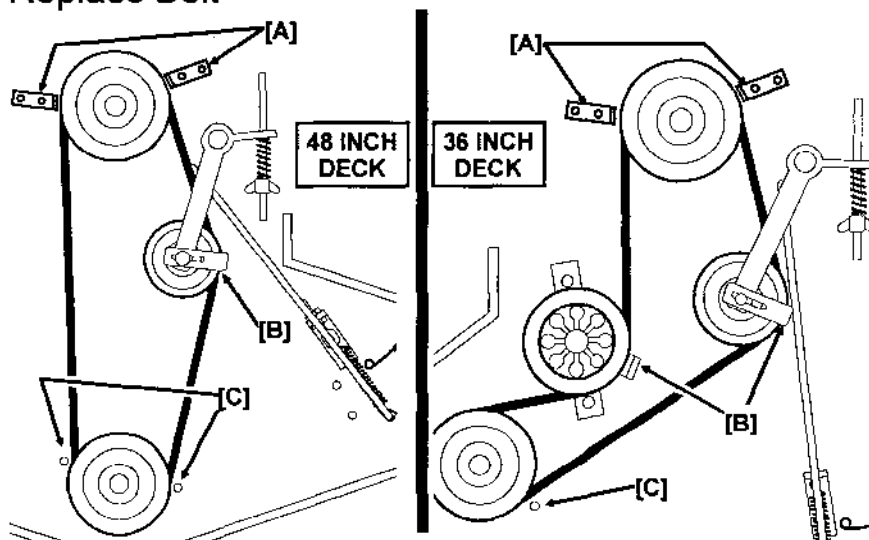


1. Remove the belt cover.
2. Move the blade control ON.
3. Measure the length of the tensioner spring.

SPRING LENGTH: 32–34 mm ($1\frac{1}{4}$ – $1\frac{5}{16}$ in)

4. Turn the wing nut to set the spring length.
5. Check the blade brake adjustment (see page 72).
6. Install the belt cover.

Replace Belt



1. Move the blade control OFF and remove the belt cover.
2. Loosen the bolts of the engine pulley belt-guides [A]. (These are accessible from the top of the unit.)
3. Loosen the pivot bolt(s) on the tensioner pulley(s) and move the belt guide(s) [B] away from the pulley.
4. Loosen the guide pin(s) [C] at the driven spindle and remove the belt. Remove the belt from the other pulleys.
5. Place the belt in position over the pulleys and move the blade control ON.
6. Adjust the tensioner pulley guide(s) [B] to the positions shown, about 3 - 5 mm ($\frac{1}{8}$ - $\frac{3}{16}$ in) from the belt.
7. Tighten the guide pin(s) [C] at the driven spindle.
8. Adjust the engine pulley guides [A] to 3 - 5 mm ($\frac{1}{8}$ - $\frac{3}{16}$ in) from the belt.
9. Cycle the blade control on and off a few times and recheck the positions of the belt guides. Check the tightness of all bolts.
10. Adjust the belt tension (page 70).

Blade Brake Adjustment

Check the blade brake adjustments whenever the deck belt is adjusted or replaced.

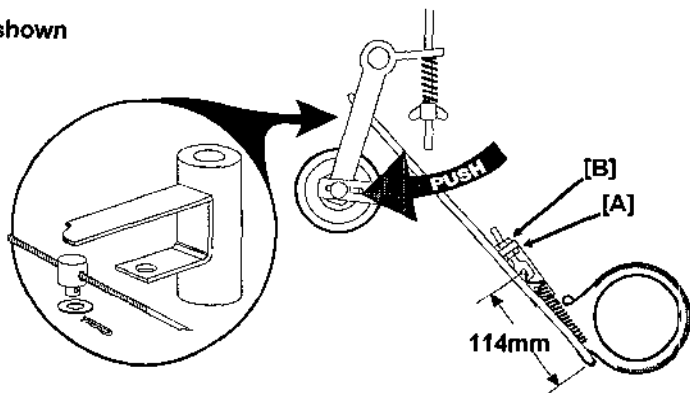
⚠ WARNING

Moving belts and pulleys can cause serious injuries.

Do not operate engine with the belt cover removed.

Before removing belt cover for maintenance, remove key from ignition switch and disconnect the spark plug lead.

48 inch deck shown



1. Move the blade control OFF and remove the belt cover.
2. The swivel on the brake rod should be in the center of its hole on the pulley arm while the pulley is lightly pushed in the direction shown. If it isn't, remove the spring pin and washer and adjust it.
3. Check the brake spring length.

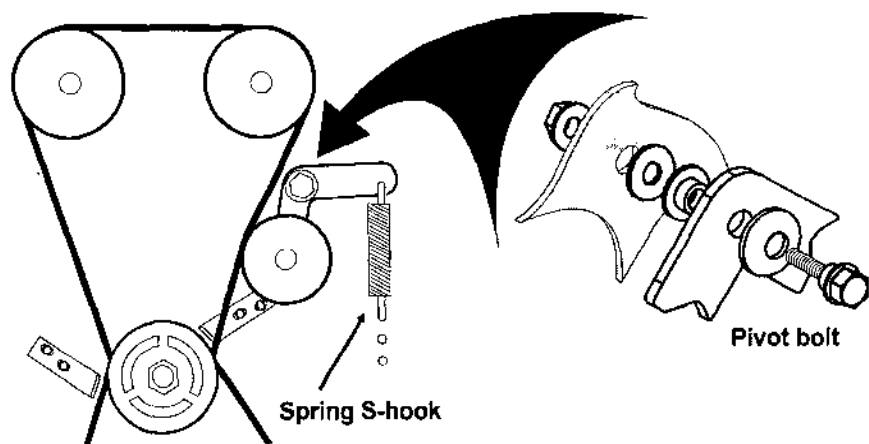
MINIMUM SPRING LENGTH (Hook to Hook):

114–117 mm ($4\frac{1}{2}$ – $4\frac{5}{8}$ in)

4. If the spring length is less than specification, adjust it.
36" deck: Loosen the two bolts holding the spring bracket and slide the bracket to a new position. Retighten the bolts.
48" deck: Loosen nut [A] on the spring post and turn nut [B] to set the length. Retighten nut [A].
5. Recheck the position of the swivel and adjust if necessary.
6. Install the belt cover.

Pump Belt Replacement and Adjustment

Replace the pump belt if it is worn, frayed, or glazed. You will need to remove the deck belt from the engine pulley first (page 70).



Remove

1. Adjust the rear mowing height to the highest setting.
2. Remove the tensioner pivot bolt and remove the tensioner.
3. Remove the belt.

Install and Adjust

1. Place the belt over the engine and pump pulleys.
2. Connect the tensioner spring to the tensioner and the S-hook on the deck. There are three holes in the deck of the power unit for the S-hook. Use the nearest hole when the belt is new. As the belt ages, move the S-hook to farther holes.
3. Insert the pivot bolt through the tensioner and into the power unit. Install and tighten the flange nut. Readjust the mowing height.

Blade Belt Adjustment and Replacement 48 inch deck

Replace the blade belt if it is worn, frayed, or glazed.

⚠ WARNING

Moving belts and pulleys can cause serious injuries.

Do not operate engine with the belt cover removed.

Before removing belt cover for maintenance, remove key from ignition switch and disconnect the spark plug lead.

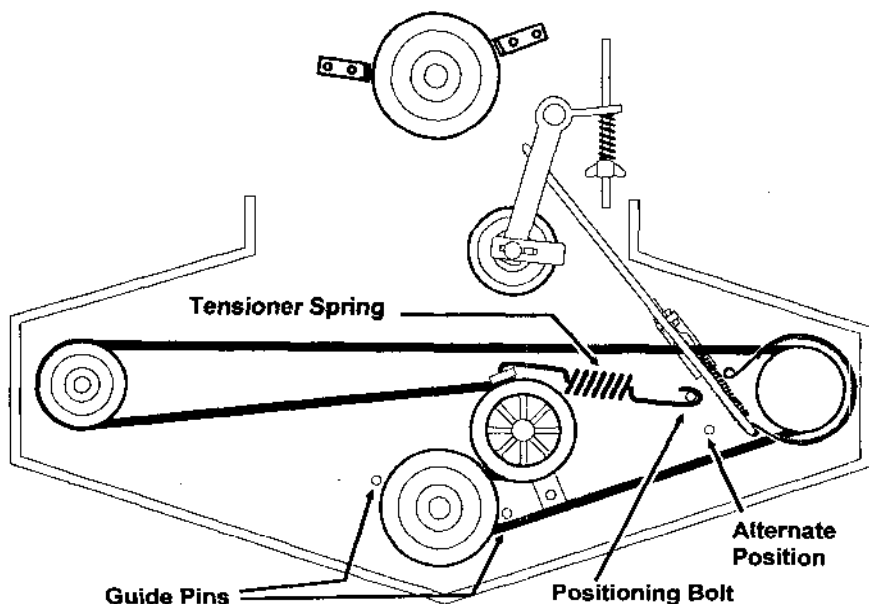
Inspect

1. Move the blade control OFF and remove the belt cover.
2. Check the tensioner spring length.

MINIMUM SPRING LENGTH (Hook to Hook):

172 mm (6³/₄ in)

3. If the spring length is less than specification, the belt needs to be adjusted.
4. Replace the belt cover.

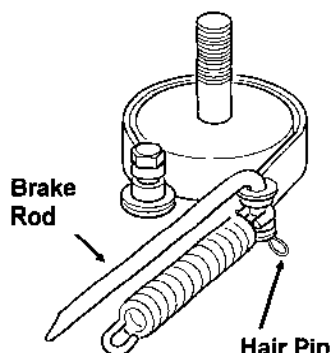


Adjust

1. Move the blade control OFF and remove the belt cover.
2. Remove the blade belt from the right (discharge-side) spindle pulley.
3. Remove the positioning bolt and install it in the alternate position. If the spring is less than minimum length with the tensioner in alternate position, the belt must be replaced.
4. Install the belt over the right spindle pulley,
5. Install the belt cover.

Replace

1. Remove the belt cover.
2. Loosen the two belt guide pins at the center spindle pulley and remove the deck belt from the pulley.
3. Remove the hair pin from the brake rod.
4. Remove the rod from the brake band (the spring will fall loose at this time).
5. Remove the blade belt from the right (discharge-side) spindle pulley, then from the rest of the pulleys.
6. Remove the positioning bolt and install it in the primary position.
7. Install the belt over the pulleys, right pulley last,
8. Install the deck belt over the center spindle pulley and tighten the belt guide pins.
9. Install the rod in brake band while attaching the spring and install the hair pin.
10. Check the brake adjustment (page 72).
11. Install the belt cover.



Blade Belt Adjustment and Replacement 36 inch deck

Replace the blade belt if it is worn, frayed, or glazed.

⚠ WARNING

Moving belts and pulleys can cause serious injuries.

Do not operate engine with the belt cover removed.

Before removing belt cover for maintenance, remove key from ignition switch and disconnect the spark plug lead.

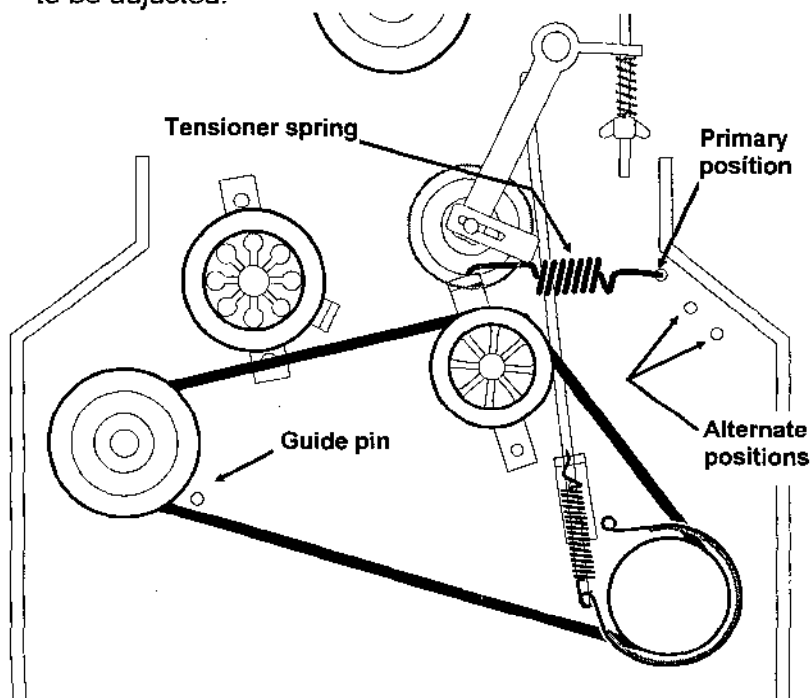
Inspect

1. Move the blade control OFF and remove the belt cover.
2. Check the tensioner spring length.

MINIMUM SPRING LENGTH (Hook to Hook):

120–140 mm ($4\frac{3}{4}$ – $5\frac{1}{2}$ in)

3. If the spring length is less than specification, the belt needs to be adjusted.



Adjust

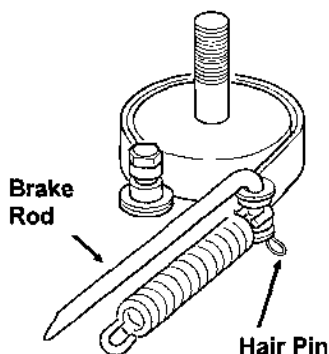
1. Move the blade control OFF and remove the belt cover.
2. Remove the blade belt from the right (discharge-side) spindle pulley.
3. Remove the spring hook and install it in the next position.
(There are two alternate positions.)

If the spring is less than minimum length with the tensioner in alternate position, the belt must be replaced.

4. Install the belt over the right spindle pulley,
5. Install the belt cover.

Replace

1. Remove the belt cover.
2. Loosen the belt guide pin at the right spindle pulley and remove the deck belt from the pulley.
3. Remove the hair pin from the brake rod.
4. Remove the rod from the brake band (the spring will fall loose).
5. Remove the blade belt from the right (discharge-side) spindle pulley, then from the rest of the pulleys.
6. Remove the spring hook and install it in the primary position.
7. Install the belt over the pulleys, right pulley last,
8. Install the deck belt over the right spindle pulley and tighten the belt guide pin.
9. Install the rod in brake band while attaching the spring and install the hair pin.
10. Check the brake adjustment (page 72).
11. Install the belt cover.

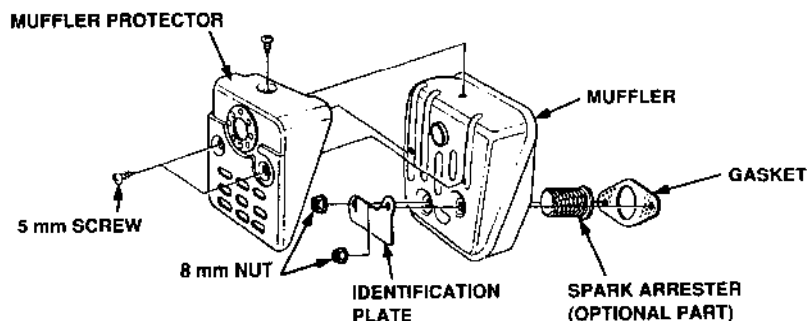


Spark Arrester (optional)

If the engine has been running, the muffler will be hot enough to burn you. Allow the muffler to cool before proceeding.

NOTICE

The spark arrester must be serviced every 100 hours to maintain its efficiency.



1. Remove the three 5 mm screws and the muffler protector.
2. Remove the 8 mm nuts, then remove the identification plate, muffler, and gasket. Remove the spark arrester.
3. Check for carbon deposits on the spark arrester and clean if necessary. Be careful to avoid damaging the spark arrester screen. The screen must be free of breaks and holes. Replace it if necessary.
4. Install the spark arrester and muffler in the reverse order of removal.

TROUBLESHOOTING

This section tells you what to look for if you encounter problems.

Engine _____ 80

Mower _____ 80

Engine

Doesn't start

The key must be ON.

Forward speed controls must be in NEUTRAL.

Fuel tank should be full of fresh fuel (page 43).

Fuel filter should be clean and free of obstructions (page 45).

Fuel valve should be on (page 11).

Throttle should be in CHOKE for cold engine, FAST for warm engine.

Spark plug connector should be firmly attached to the spark plug.

Spark plug should be correctly gapped and be free of deposits (page 49).

Blade control must be OFF.

Low power

Air cleaner elements should be clean (page 42).

Spark plug should be correctly gapped and be free of deposits (page 49).

Mower deck should be free of grass accumulation.

Tall grass should be cut at lower speeds and/or higher cutting heights.

Incorrect carburetor or governor linkage adjustment (page 52).

Mower

Doesn't move

Forward speed controls must be out of NEUTRAL.

Neutral locks must be released

Both pump bypass valves must be closed (page 28).

The pump drive belt must be in good condition (page 73).

The hydrostatic oil should be at the correct level (page 54).

Pulls to one side

Tires should be correctly inflated (page 62).

The control linkages must be correctly adjusted (page 57).

Both pump bypass valves must be closed (page 28).

Vibrates

Blades should be in good condition (page 67).

The deck must be free of any accumulation of clippings.

Deck and blade belts should be in good condition and at correct tension (page 70).

Cuts poorly

Throttle should be in FAST.

Cutting height must be at the same setting at front and rear (page 63).

Blades should be in good condition (page 67).

Mower deck should be free of grass accumulation.

Deck and blade belts should be in good condition and at correct tension (page 70).

Tall grass should be cut at lower speeds and/or higher cutting heights.

SPECIFICATIONS

This section provides you with important dimensions and capacities.

Mower _____ 84

Engine _____ 85

SPECIFICATIONS

Mower

Mower deck	36 inch	48 inch
Length	2.03 m (80 in)	1.93 m (76 in)
Width: Chute up	0.91 m (36 in)	1.24 m (49 in)
Chute down	1.19 m (47 in)	1.50 m (59 in)
Height	1.20 m (47 1/4 in)	
Operating weight	241 kg (533 lb)	267 kg (590 lb)
Maximum speed:		
Forward	8km/h (5 mph)	
Reverse	3km/h (2 mph)	
Drive system	Zero-turn hydrostatic drive	
Hydrostatic oil	10W-40 SG	
Hydrostatic oil capacity	9.8/(10.4 qt)	
Tire size:		
Drive wheel	4-ply 16 x 6.50 x 8	
Caster wheel	2-ply 4.10 x 3.50 x 5	
Tire pressure:		
Drive wheel	103 kPa (15 psi)	
Caster wheel	193 kPa (28 psi)	
Cutting height:		
Low range	38 - 89 mm (1½ - 3½ in)	
High range	89 - 140 mm (3½ - 5½ in)	

Engine

Model	GXV390DA23
Horsepower @ rpm	13 hp @ 3600 rpm
Maximum no-load governed speed	3550±50 rpm
Idle speed	1750 ⁺²⁰⁰ ₋₀ rpm
Ignition system	Transistorized magneto
Valve clearance:	
Intake	0.08 - 0.12 mm (0.003 - 0.005 in)
Exhaust	0.13 - 0.17 mm (0.005 - 0.007 in)
Spark plug	ND—BPR5ES NGK—W16EPR-U
Spark plug gap	0.7 - 0.8 mm (0.028 - 0.032 in)
Fuel	Unleaded gasoline, 86 pump octane, min.
Fuel tank capacity	16.6ℓ (4.4 gal)
Engine oil	10W-30 SF, SG or equivalent
Engine oil capacity	1.1ℓ (1.2 qt)

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ADDITIONAL INFORMATION

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Customer Service Information _____ 91

Honda Publications

These publications will give you additional information about maintaining your mower. You may order them from an authorized Honda servicing dealer.

Shop Manual

This manual covers complete maintenance and overhaul procedures. It is intended to be used by a skilled technician.

Parts Catalog

This provides a complete pictorial parts listing.

Customer Service Information

Honda Power Equipment dealerships are staffed by trained professionals. They should be able to answer any question you may have. If you encounter a problem that your dealer does not solve to your satisfaction, please discuss it with the dealership's management. Almost all problems are solved in this way.

If you are not satisfied with the decision made by the dealership's management, contact Honda Power Equipment Customer Service Office.

You can write to:

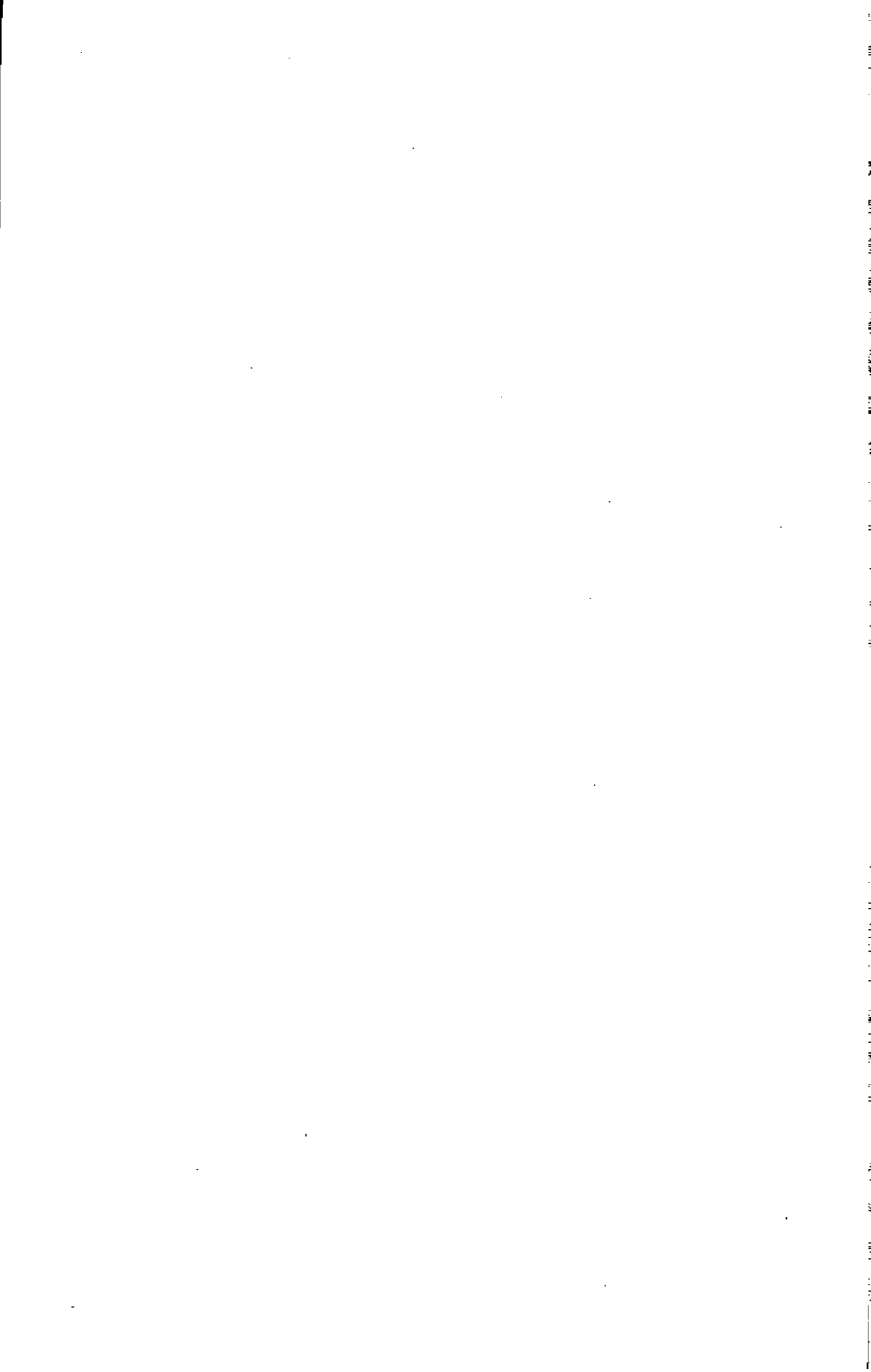
Honda Power Equipment Division
Customer Service Office
4475 River Green Parkway
Duluth, GA 30136-2565

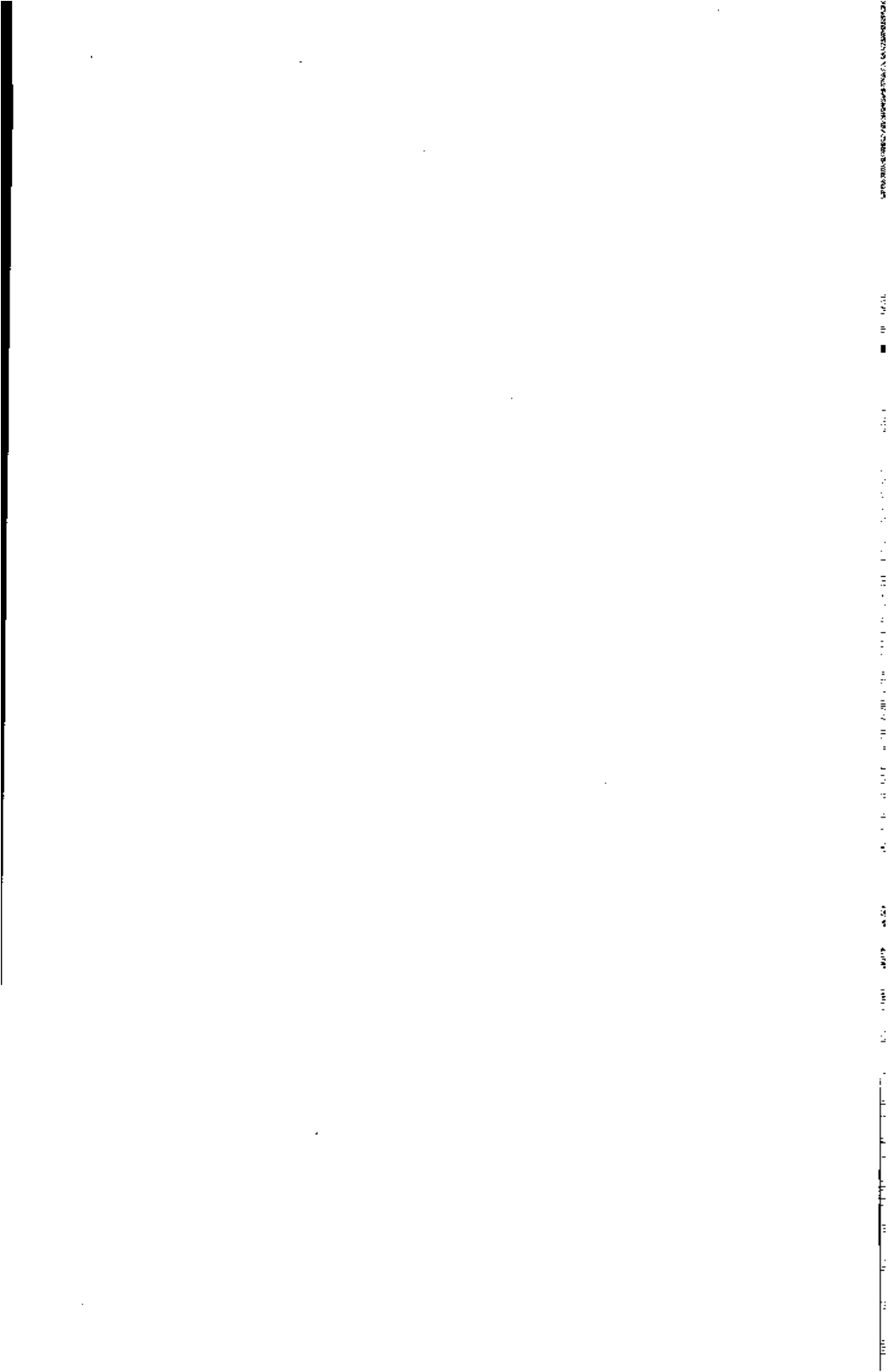
Or telephone:

(404) 497-6400

When you write or call, please give us this information

- Identification number (power unit and mower deck).
- Name of the dealer who sold the mower to you.
- Name and address of the dealer who services your mower.
- Date of purchase.
- Your name, address, and telephone number.
- A detailed description of the problem.





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