

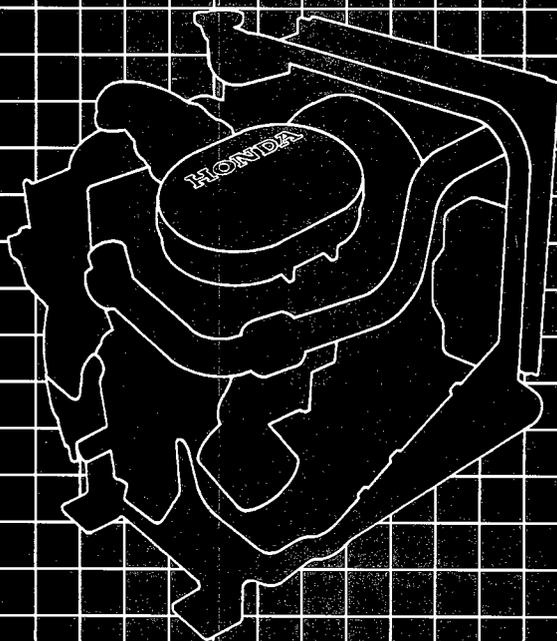
# **HONDA**

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# **ENGINES**

## Owner's Manual

### **GX360**





## **WARNING:**



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

Keep this owner's manual handy, so you can refer to it at any time. This owner's manual is considered a permanent part of the engine and should remain with the engine if resold.

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# INTRODUCTION

Congratulations on your selection of a Honda engine. We are certain you will be pleased with your purchase of one of the finest engines on the market.

We want to help you get the best results from your new engine and to operate it safely. This manual contains the information on how to do that; please read it carefully.

As you read this manual, you will find information preceded by a **NOTICE** symbol. That information is intended to help you avoid damage to your engine, other property, or the environment.

We suggest you read the warranty policy to fully understand its coverage and your responsibilities of ownership. The warranty policy is a separate document that should have been given to you by your dealer.

When your engine needs scheduled maintenance, keep in mind that your Honda servicing dealer is specially trained in servicing Honda engines. Your Honda servicing dealer is dedicated to your satisfaction and will be pleased to answer your questions and concerns.

Best Wishes,  
Honda Motor Co., Ltd.

# INTRODUCTION

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## A FEW WORDS ABOUT SAFETY

Your safety and the safety of others are very important. And using this engine safely is an important responsibility.

To help you make informed decisions about safety, we have provided operating procedures and other information on labels and in this manual. This information alerts you to potential hazards that could hurt you or others.

Of course, it is not practical or possible to warn you about all the hazards associated with operating or maintaining an engine. You must use your own good judgment.

You will find important safety information in a variety of forms, including:

- **Safety Labels** — on the engine.
- **Safety Messages** — preceded by a safety alert symbol  and one of three signal words, DANGER, WARNING, or CAUTION.

These signal words 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.

- **Safety Headings** — such as *IMPORTANT SAFETY INFORMATION*.
- **Safety Section** — such as *ENGINE SAFETY*.
- **Instructions** — how to use this engine correctly and safely.

This entire book is filled with important safety information — please read it carefully.

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# ENGINE SAFETY

## IMPORTANT SAFETY INFORMATION

Most accidents with engines can be prevented if you follow all instructions in this manual and on the engine. Some of the most common hazards are discussed below, along with the best way to protect yourself and others.

### Owner Responsibilities

- Honda engines are designed to give safe and dependable service if operated according to instructions. Read and understand this owner's manual before operating the engine. Failure to do so could result in personal injury or equipment damage.
- Know how to stop the engine quickly, and understand the operation of all controls. Never permit anyone to operate the engine without proper instructions.
- Do not allow children to operate the engine. Keep children and pets away from the area of operation.

### Refuel With Care

Gasoline is extremely flammable, and gasoline vapor can explode. Refuel outdoors, in a well-ventilated area, with the engine stopped. Never smoke near gasoline, and keep other flames and sparks away. Always store gasoline in an approved container. If any fuel is spilled, make sure the area is dry before starting the engine.

### Hot Exhaust

- The muffler becomes very hot during operation and remains hot for a while after stopping the engine. Be careful not to touch the muffler while it is hot. Let the engine cool before storing it indoors.
- To prevent fire hazards and to provide adequate ventilation for stationary equipment applications, keep the engine at least 3 feet (1 meter) away from building walls and other equipment during operation. Do not place flammable objects close to the engine.

# **ENGINE SAFETY**

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## **Carbon Monoxide Hazard**

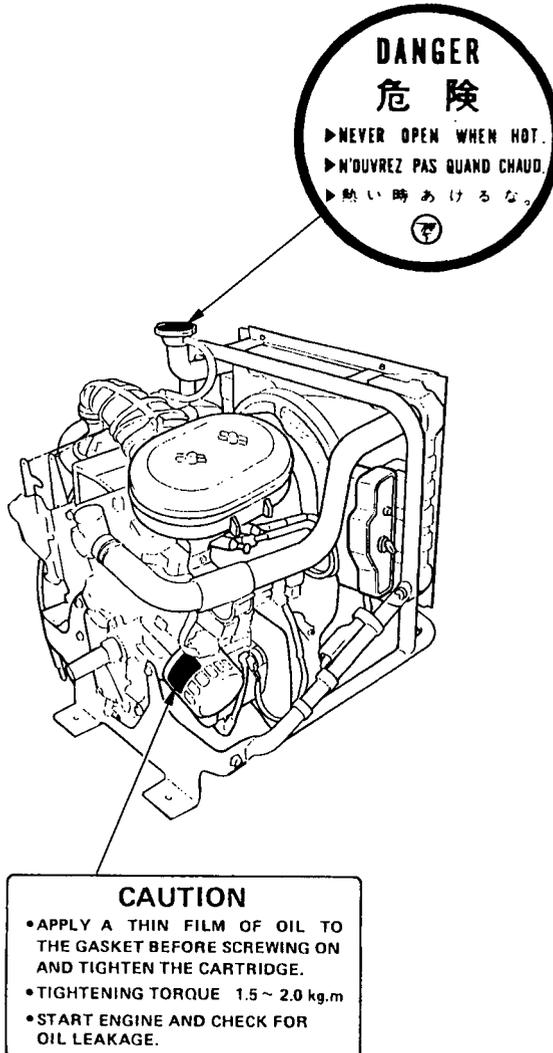
Exhaust gas contains poisonous carbon monoxide. Avoid inhalation of exhaust gas. Never run the engine in a closed garage or confined area.

## **Other Equipment**

Review the instructions provided with the equipment powered by this engine for any additional safety precautions that should be observed in conjunction with engine startup, shutdown, or operation, or protective apparel that may be needed to operate the equipment.

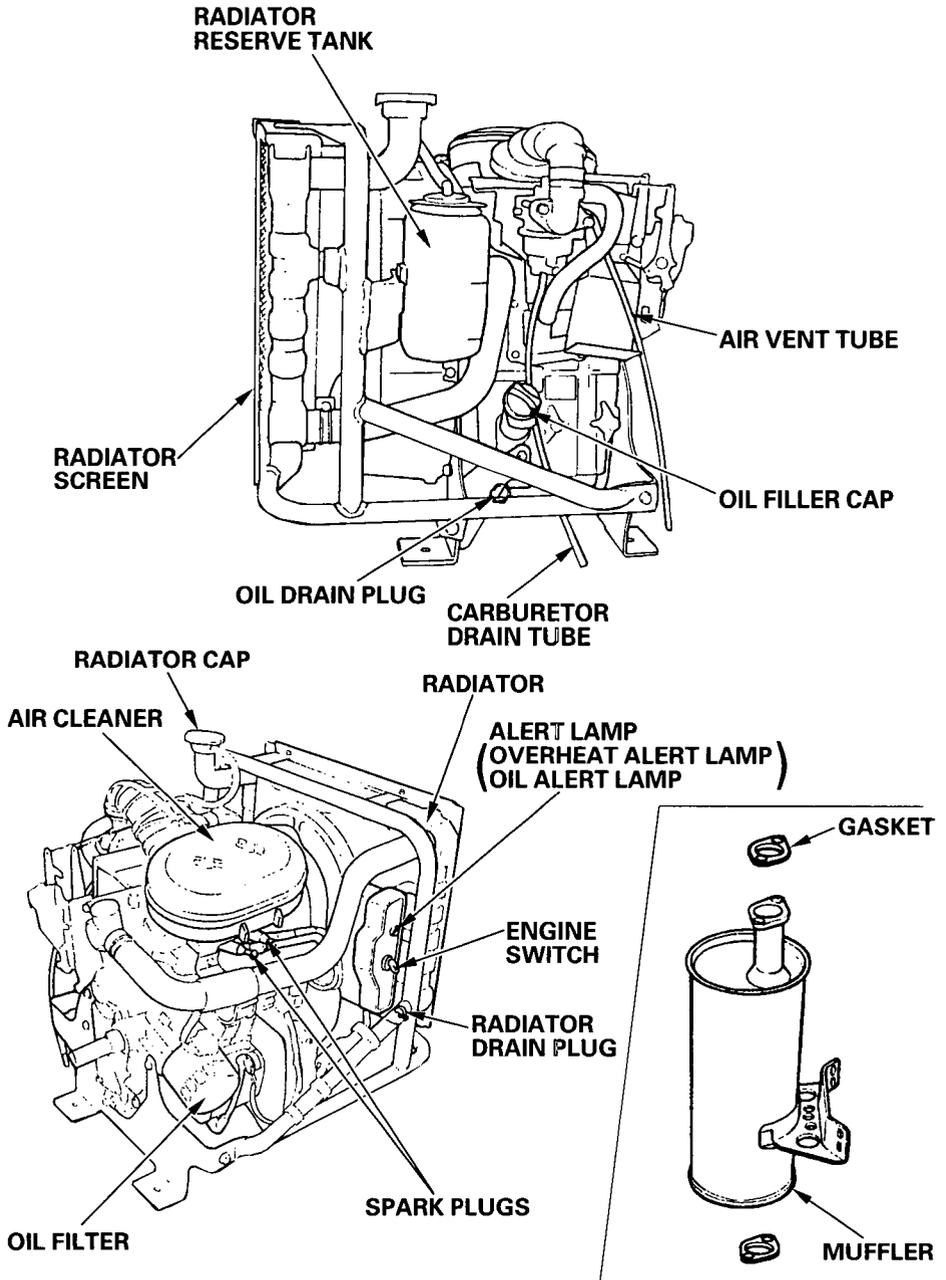
## SAFETY LABEL LOCATIONS

The labels shown here contain important safety information. Please read them carefully. These labels are considered permanent parts of your engine. If a label comes off or becomes hard to read, contact an authorized Honda servicing dealer for a replacement.



# CONTROLS & FEATURES

## COMPONENT & CONTROL LOCATIONS



## CONTROLS

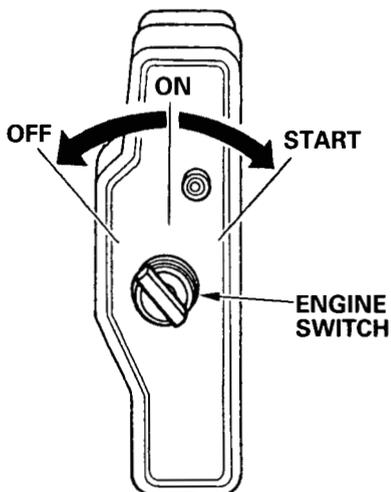
### Engine Switch

The engine switch enables and disables the ignition system.

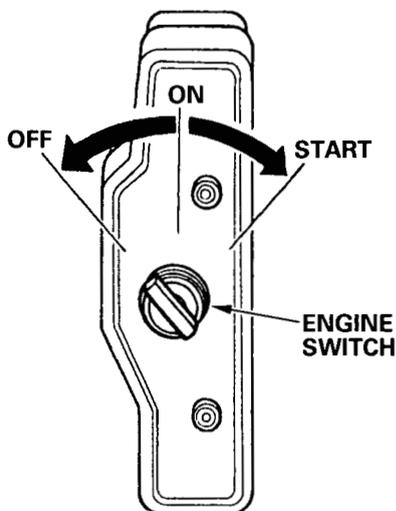
The engine switch must be in the ON position for the engine to run.

Turning the engine switch to the OFF position stops the engine.

Turning the engine switch to the START position operates the electric starter to crank the engine. The key automatically returns to the ON position when released from the START position.



**10A CHARGE COIL TYPE**



**3A CHARGE COIL TYPE**

# CONTROLS & FEATURES

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## Control Lever

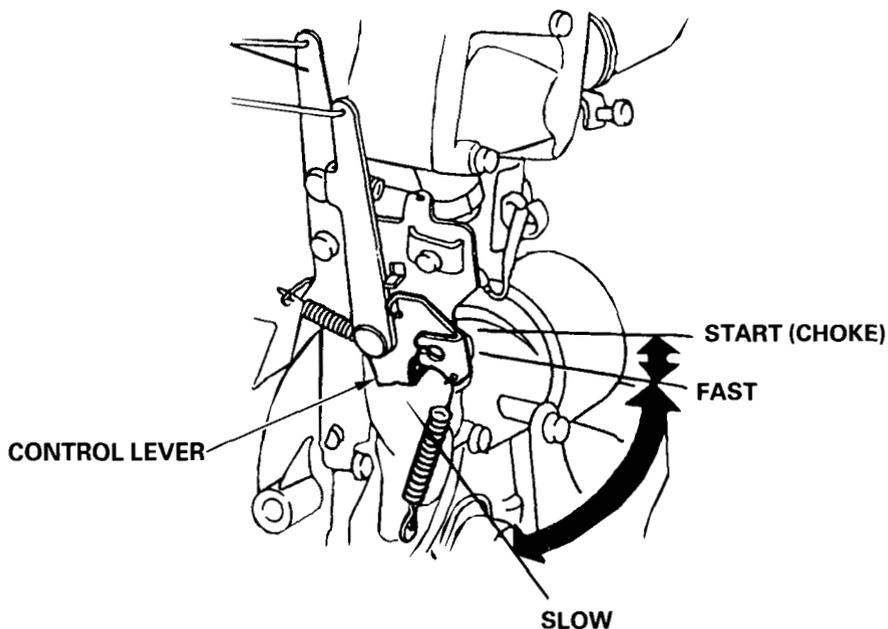
The control lever operates the throttle and choke.

**SLOW** ————— For running the engine at low or idle speed.

**FAST** ————— For restarting a warm engine, and for running the engine at maximum speed.

**START (CHOKE)** ————— Enriches the fuel mixture for starting a cold engine.

Some engine applications use a remotely-mounted control rather than the engine-mounted control lever shown here. Refer to the instructions provided with the equipment powered by this engine for remote control information.

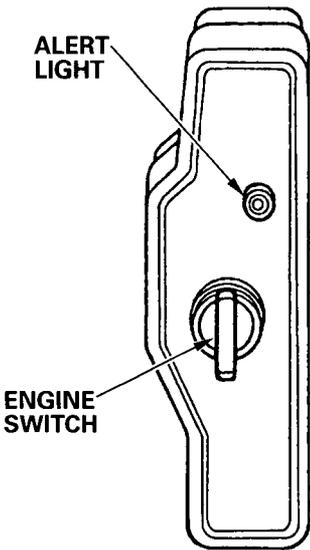


## FEATURES

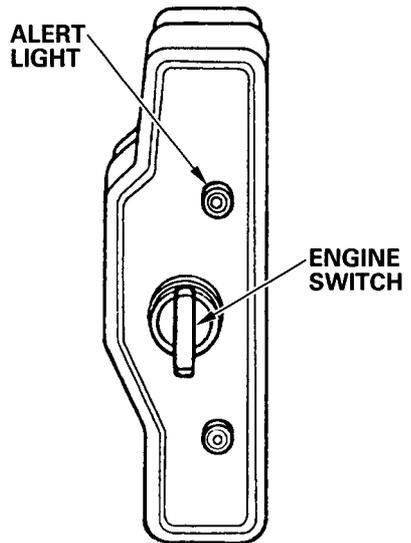
### Engine Protection System

The engine protection system automatically stops the engine to prevent damage from lack of lubrication or overheating.

If there is a loss of oil pressure, which may indicate low oil level, or if the coolant becomes too hot, the engine will stop, and the alert light will come on (the engine switch will remain in the ON position).



10A CHARGE COIL TYPE



3A CHARGE COIL TYPE

# CONTROLS & FEATURES

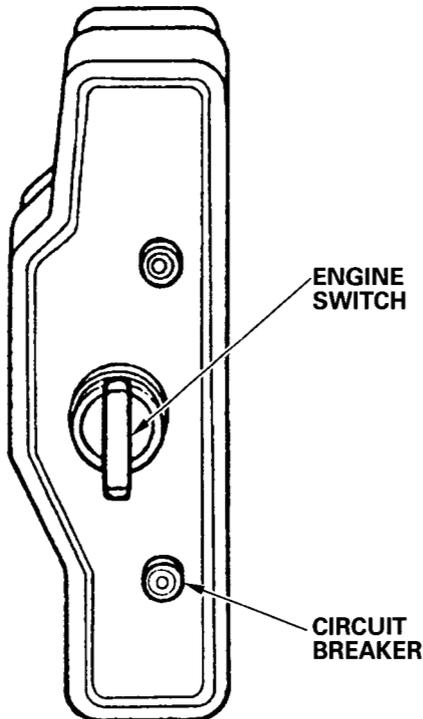
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## Circuit Breaker (3A charge coil type)

The circuit breaker protects the battery charging circuit. A short circuit, or a battery connected with reverse polarity, will trip the circuit breaker.

The green indicator inside the circuit breaker will pop out to show that the circuit breaker has switched off. If this occurs, determine the cause of the problem, and correct it before resetting the circuit breaker.

Push the circuit breaker button to reset.



# BEFORE OPERATION

## IS YOUR ENGINE READY TO GO?

For your safety, and to maximize the service life of your equipment, it is very important to take a few moments before you operate the engine to check its condition. Be sure to take care of any problem you find, or have your servicing dealer correct it, before you operate the engine.

### **⚠ WARNING**

Improperly maintaining this engine, or failing to correct a problem before operation, could cause a malfunction in which you could be seriously injured.

Always perform a preoperation inspection before each operation, and correct any problem.

Before beginning your preoperation checks, be sure the engine is level and the engine switch is in the OFF position.

### **Check the General Condition of the Engine**

- Look around and underneath the engine for signs of oil, gasoline, or coolant leaks.
- Remove any excessive dirt or debris, especially around the muffler.
- Look for signs of damage.
- Check that all shields and covers are in place, and all nuts, bolts, and screws are tightened.

# **BEFORE OPERATION**

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## **Check the Engine**

- Check the engine oil level (see page 25). The engine protection system will automatically stop the engine before the oil level falls below safe limits. However, to avoid the inconvenience of an unexpected shutdown, always check the engine oil level before startup.
- Check the coolant level in the reserve tank (see page 34). It should be between the MAX and MIN marks when the engine is at normal operating temperature.
- Check the radiator screen (see page 32), and clean it if blocked with dirt and debris.
- Check the air filter (see page 29). A dirty air filter will restrict air flow to the carburetor, reducing engine performance.
- Check the fuel level. Starting with a full fuel tank will help to eliminate or reduce operating interruptions for refueling.

## **Check the Equipment Powered by This Engine**

Review the instructions provided with the equipment powered by this engine for any precautions and procedures that should be followed before engine startup.

# OPERATION

## SAFE OPERATING PRECAUTIONS

Before operating the engine for the first time, please review the *IMPORTANT SAFETY INFORMATION* on page 5 and the chapter titled *BEFORE OPERATION*.

### **WARNING**

Carbon monoxide gas is toxic.  
Breathing it can cause  
unconsciousness and even kill you.

Avoid any areas or actions that  
expose you to carbon monoxide.

Review the instructions provided with the equipment powered by this engine for any safety precautions that should be observed in conjunction with engine startup, shutdown, or operation.

# OPERATION

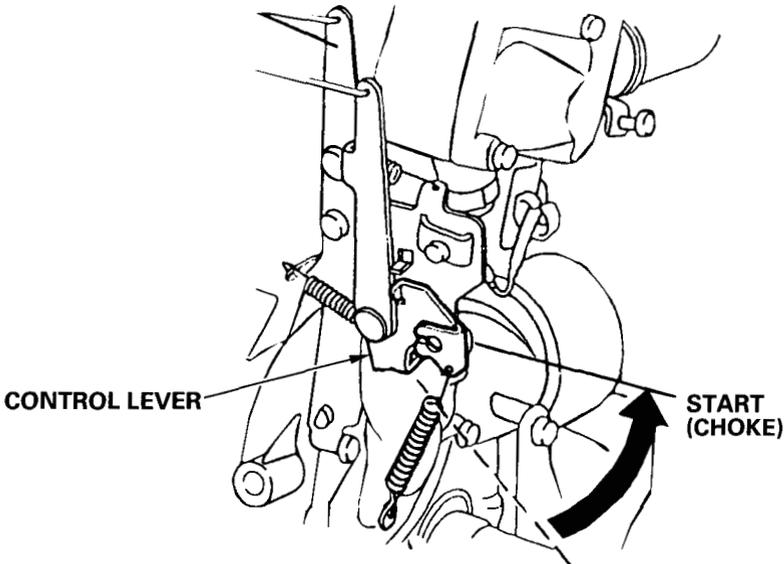
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## STARTING THE ENGINE

1. If the fuel tank is equipped with a valve, be sure the fuel valve is in the OPEN or ON position before attempting to start the engine.
2. To start a cold engine, move the control lever to the START (CHOKE) position.

To restart a warm engine, leave the control lever in the FAST position.

Some engine applications use a remotely-mounted control rather than the engine-mounted control lever shown here. Refer to the instructions provided with the equipment powered by this engine for remote control information.



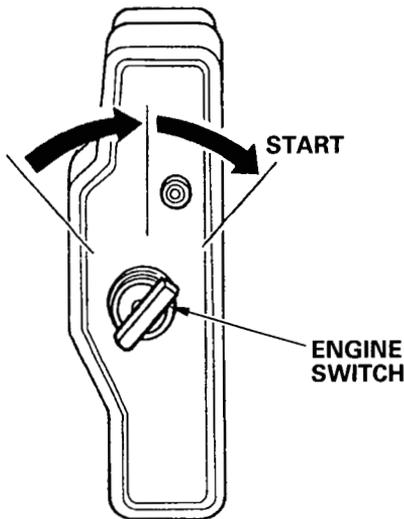
- Turn the engine switch to the START position, and hold it there until the engine starts.

If the engine fails to start within 5 seconds, release the key, and wait at least 10 seconds before operating the starter again.

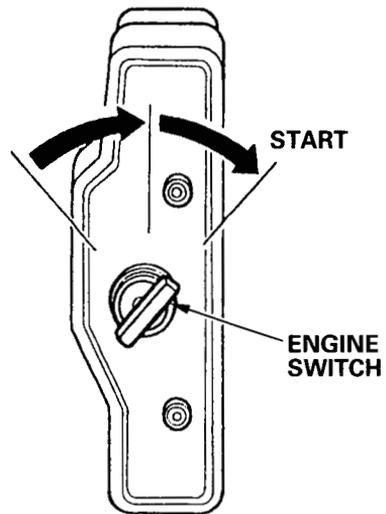
**NOTICE**

*Using the electric starter for more than 5 seconds at a time will overheat the starter motor and can damage it.*

When the engine starts, release the key, allowing it to return to the ON position.



10A CHARGE COIL TYPE



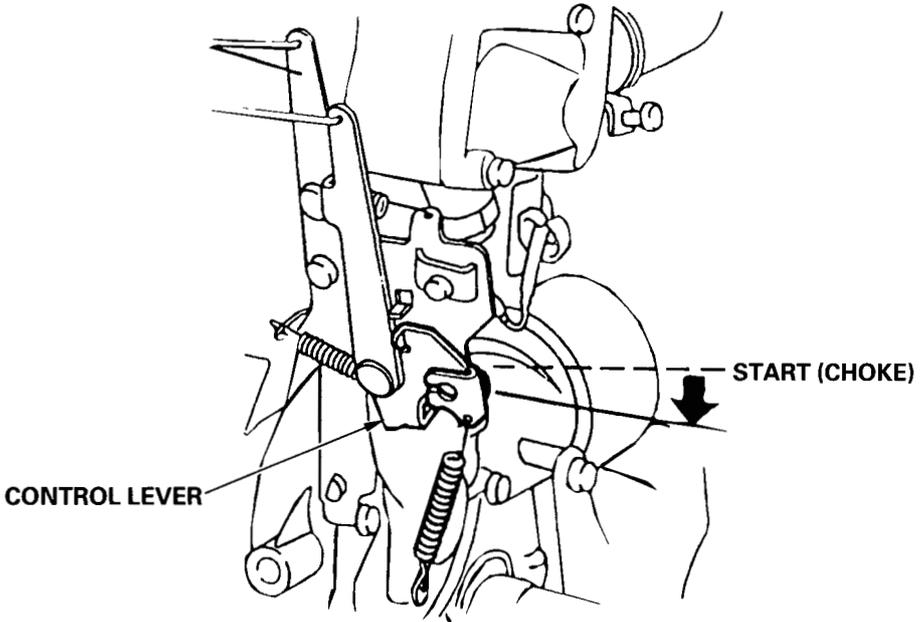
3A CHARGE COIL TYPE

# OPERATION

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4. If the control lever has been moved to the START (CHOKE) position to start the engine, gradually move it to the FAST or SLOW position as the engine warms up.

Some engine applications use a remotely-mounted control rather than the engine-mounted control lever shown here. Refer to the instructions provided with the equipment powered by this engine for remote control information.

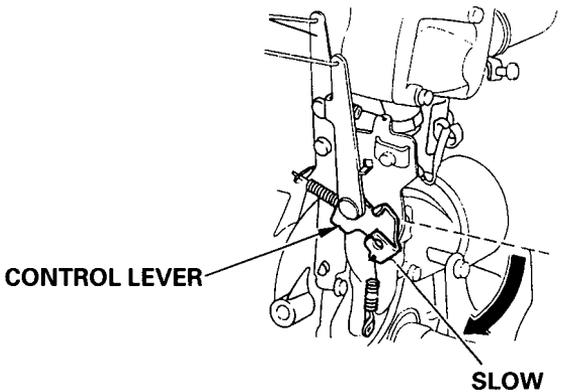


## STOPPING THE ENGINE

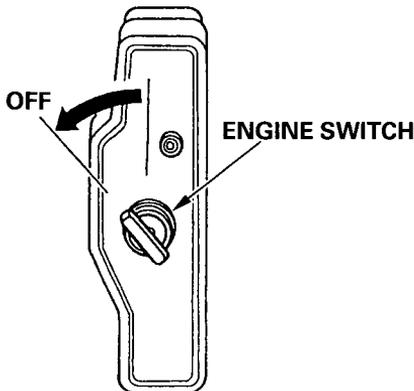
To stop the engine in an emergency, simply turn the engine switch to the OFF position. Under normal conditions, use the following procedure.

1. Move the control lever to the SLOW position.

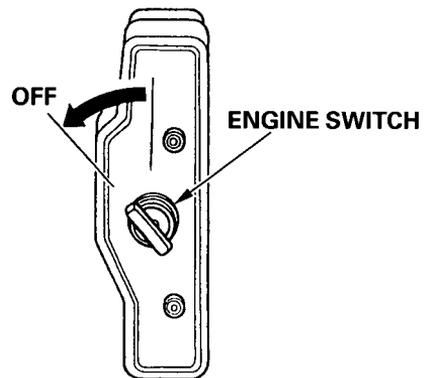
Some engine applications use a remotely-mounted control rather than the engine-mounted control lever shown here. Refer to the instructions provided with the equipment powered by this engine for remote control information.



2. Turn the engine switch to the OFF position.



10A CHARGE COIL TYPE



3A CHARGE COIL TYPE

3. If the fuel tank is equipped with a valve, turn the fuel valve to the CLOSED or OFF position.

# OPERATION

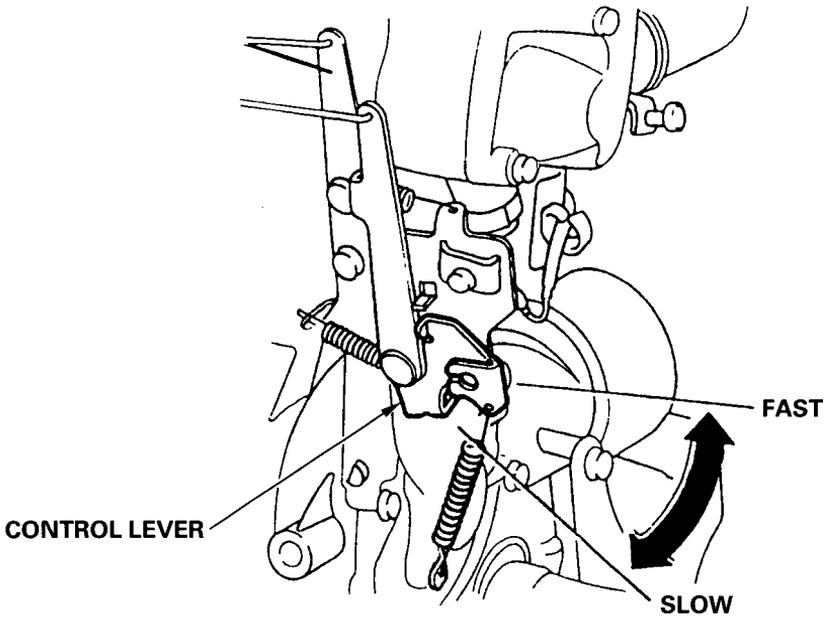
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## SETTING ENGINE SPEED

Position the control lever for the desired engine speed.

Some engine applications use a remotely-mounted control rather than the engine-mounted control lever shown here.

For engine speed recommendations, refer to the instructions provided with the equipment powered by this engine.



# SERVICING YOUR HONDA ENGINE

## THE IMPORTANCE OF MAINTENANCE

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

### **WARNING**

Improperly maintaining this engine, 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.

To help you properly care for your engine, 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 your engine under unusual conditions, such as sustained high-load or high-temperature operation, or use in unusually wet or dusty conditions, consult your servicing dealer for recommendations applicable to your individual needs and use.

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

# SERVICING YOUR HONDA ENGINE

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## 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.

Remember that your servicing dealer knows your engine 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.

# SERVICING YOUR HONDA ENGINE

## MAINTENANCE SCHEDULE

REGULAR SERVICE PERIOD (3)		ITEM	Perform at every indicated month or operating hour interval, whichever comes first.	Each use	First month or 20 Hrs.	Every 3 months or 50 Hrs.	Every 6 months or 100 Hrs.	Every year or 300 Hrs.	Refore to page	
•	Engine oil	Check level	○						25	
		Change			○		○		26	
•	Engine oil filter	Replace						Every 200 Hrs.	27	
•	Air cleaner	Check	○						29	
		Clean				○ (1)			30	
		Replace						○ *		
•	Radiator screen	Clean	○					○	32	
	Radiator (out side)	Clean						○	33	
•	Radiator coolant	Check	○						34	
		Change		Every 2 years						36
	Radiator core	Clean					○ (1)		33	
•	Spark plug	Check-adjust					○		39	
		Replace						○		
	Spark arrester (optional part)	Clean					○		41	
•	Idle speed	Check-adjust						○ (2)	40	
•	Valve clearance	Check-adjust						○ (2)	—	
•	Combustion chamber	Clean		After every 500 Hrs. (2)						—
•	Fuel filter	Clean					○		—	
		Replace						○ (2)	—	
•	Fuel tank (4)	Clean		Every year (2)						—
•	Fuel tube	Check		Every 2 years (Replace if necessary) (2)						—

### • Emission-related items.

\* Replace the paper filter element only.

- (1) Service more frequently when used in dusty areas.
- (2) These items should be serviced by your servicing dealer, unless you have the proper tools and are mechanically proficient. Refer to Honda shop manual for service procedures.
- (3) For commercial use, log hours of operation to determine proper maintenance intervals.
- (4) The fuel tank is not supplied with the Honda GX 360 engine.

# SERVICING YOUR HONDA ENGINE

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## FUEL RECOMMENDATIONS

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

These engines are 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 an oil/gasoline mixture. Avoid getting dirt or water in the fuel tank.

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

If spark knock or pinging occurs at a steady engine speed, under normal load, change brands of gasoline. If spark knock or pinging persists, see an authorized Honda servicing dealer.

### **NOTICE**

*Running the engine with persistent spark knock or pinging can cause engine damage.*

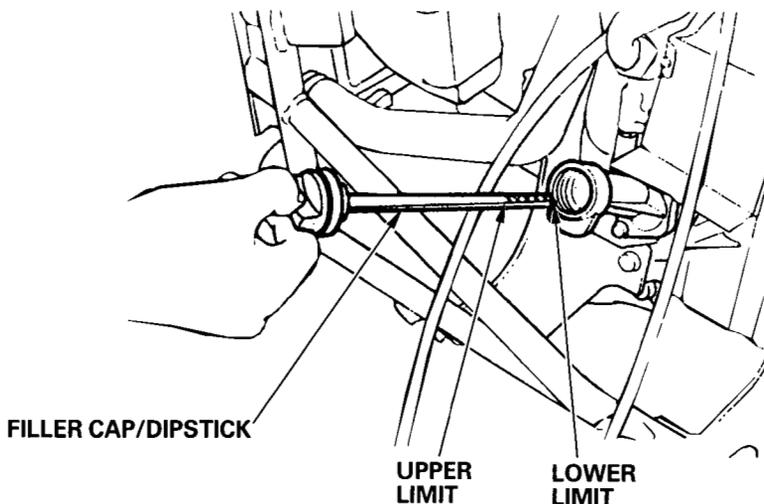
Running the engine with persistent spark knock or pinging is misuse, and the *Distributor's Limited Warranty* does not cover parts damaged by misuse.

# SERVICING YOUR HONDA ENGINE

## ENGINE OIL LEVEL CHECK

Check the engine oil level with the engine stopped and in a level position.

1. Remove the filler cap/dipstick and wipe it clean.
2. Insert and remove the dipstick without screwing it into the filler neck. Check the oil level shown on the dipstick.
3. If the oil level is near or below the lower limit mark on the dipstick, fill with the recommended oil to the upper limit mark (see page 28).
4. Screw in the filler cap/dipstick securely.



### NOTICE

*Running the engine with a low oil level can cause engine damage.*

The engine protection system will automatically stop the engine before the oil level falls below safe limits. However, to avoid the inconvenience of an unexpected shutdown, always check the engine oil level before startup.

# SERVICING YOUR HONDA ENGINE

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## ENGINE OIL CHANGE

Drain the used oil while the engine is warm. Warm oil drains quickly and completely.

1. Place a suitable container below the engine to catch the used oil, then remove the filler cap/dipstick and the drain plug.
2. Allow the used oil to drain completely, then reinstall the drain plug, and tighten it securely.

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

3. With the engine in a level position, fill to the upper limit mark on the dipstick with the recommended oil (see page 28).

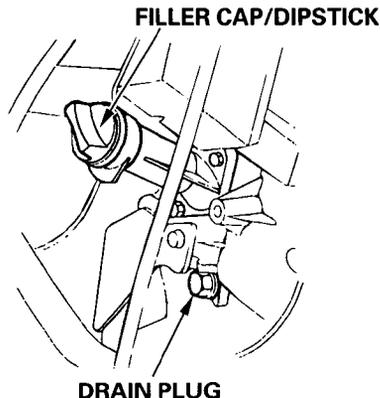
### ENGINE OIL REFILL CAPACITIES:

Without oil filter replacement: 1.16 US qt (1.10 ℓ , 0.97 Imp qt)

With oil filter replacement: 1.48 US qt (1.40 ℓ , 1.23 Imp qt)

The engine protection system will automatically stop the engine before the oil level falls below the safe limit. However, to avoid the inconvenience of an unexpected shutdown, fill to the upper limit, and check the oil level regularly.

4. Screw in the filler cap/dipstick securely.



# SERVICING YOUR HONDA ENGINE

## OIL FILTER CHANGE

1. Drain the engine oil, and retighten the drain plug securely (see page 26).
2. Remove the oil filter, and drain the oil into a suitable container. Discard the used oil filter.
3. Clean the filter mounting base, and coat the gasket of the new oil filter with clean engine oil.

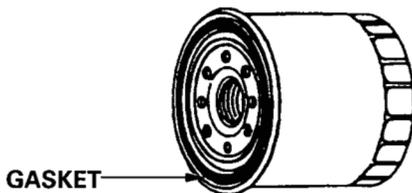
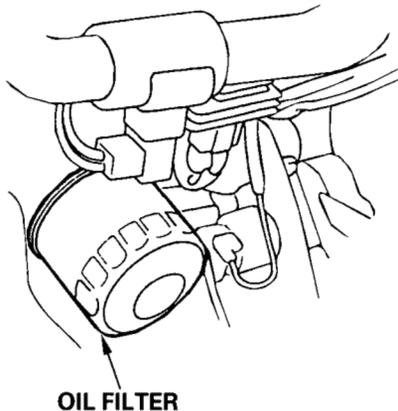
### NOTICE

*Use only a genuine Honda oil filter or a filter of equivalent quality specified for your model. Using the wrong filter, or a non-Honda filter which is not of equivalent quality, may cause engine damage.*

4. Screw on the new oil filter by hand, until the gasket contacts the filter mounting base, then use an oil filter wrench to tighten the filter an additional 7/8 turn.

**OIL FILTER TIGHTENING TORQUE:** 13 lbf-ft (17 N·m , 1.75 kgf·m)

5. Refill the crankcase with the specified amount of the recommended oil (see page 26 & 28). Reinstall the oil filter cap/dipstick.
6. Start the engine and check for oil filter leaks.
7. Stop the engine, and check the oil level as described on page 25. If necessary, add oil to the upper limit mark on the dipstick.



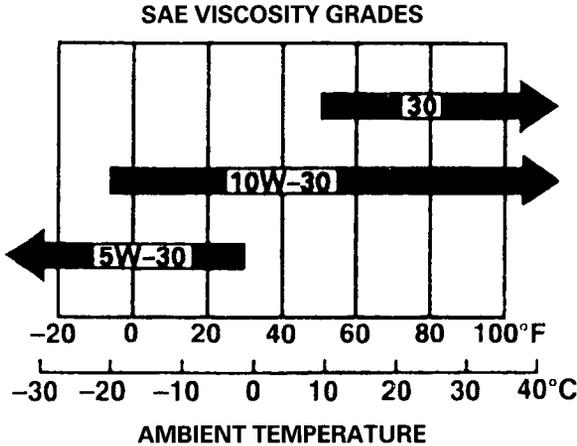
# SERVICING YOUR HONDA ENGINE

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## ENGINE OIL RECOMMENDATIONS

Oil is a major factor affecting performance and service life. Use 4-stroke automotive detergent oil.

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



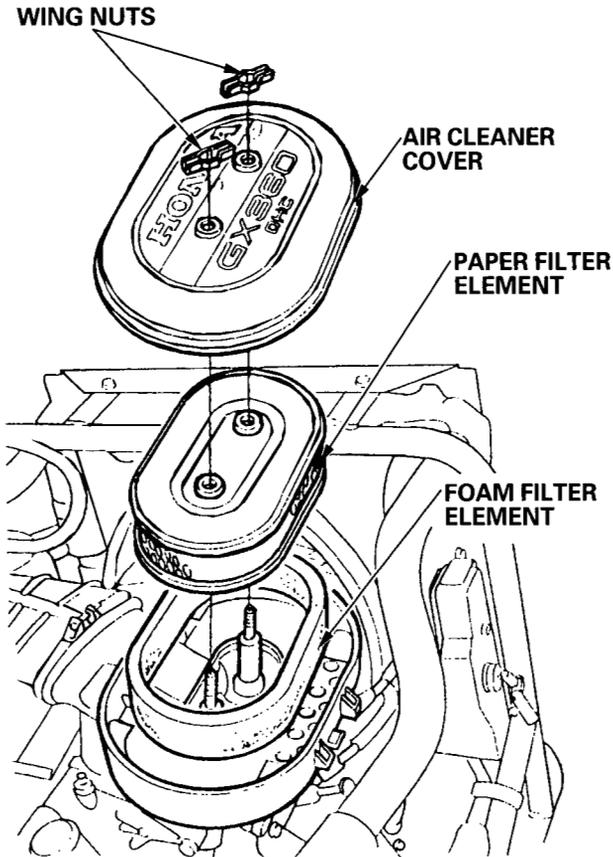
The SAE oil viscosity and service classification are in the API label on the oil container. Honda recommends that you use API SERVICE category SJ oil.

# SERVICING YOUR HONDA ENGINE

## AIR FILTER INSPECTION

Remove the two wing nuts, and remove the air cleaner cover. Check the filter elements to be sure they are clean and in good condition.

If the filter elements are dirty, clean or replace them as described on page 30. Damaged filter elements must be replaced.



# SERVICING YOUR HONDA ENGINE

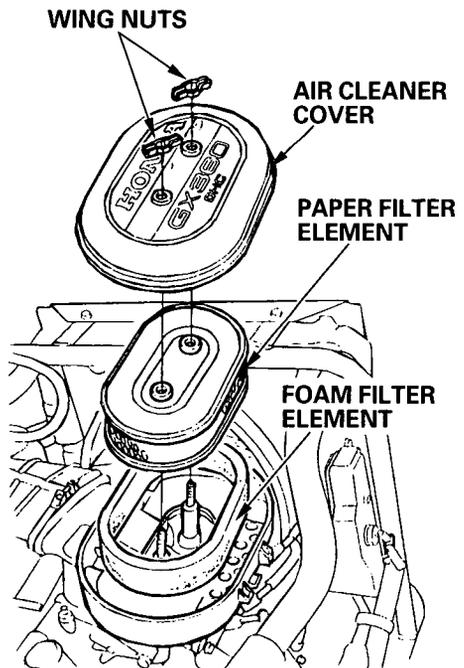
## AIR CLEANER SERVICE

A dirty air filter will restrict air flow to the carburetor, reducing engine performance. If you operate the engine in very dusty areas, clean the air filter more often than specified in the MAINTENANCE SCHEDULE.

### NOTICE

*Operating the engine without an air filter, or with a damaged air filter, will allow dirt to enter the engine, causing rapid engine wear. This type of damage is not covered by the Distributor's Limited Warranty.*

1. Remove the two wing nuts from the air cleaner cover, and remove the cover.
2. Remove the filter elements, and separate the foam filter element from the paper filter element.
3. Inspect both air filter elements, and replace them if they are damaged. Always replace the paper filter element at the scheduled interval (see page 23).



# SERVICING YOUR HONDA ENGINE

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4. Clean the air filter elements if they are to be reused.

Paper filter element: Tap the filter element several times on a hard surface to remove dirt, or blow compressed air [not exceeding 30 psi (207kPa, 2.1 kgf/cm<sup>2</sup>)] through the filter element from the inside. Never try to brush off dirt; brushing will force dirt into the fibers. Replace the paper filter element if it is excessively dirty.

Foam filter element: Clean in warm soapy water, rinse, and allow to dry thoroughly. Or clean in nonflammable solvent and allow to dry. Dip the filter element in clean engine oil, then squeeze out all excess oil. The engine will smoke when started if too much oil is left in the foam.

5. Wipe dirt from the inside of the air cleaner base and cover, using a moist rag. Be careful to prevent dirt from entering the air duct that leads to the carburetor.
6. Place the foam filter element over the paper filter element, and reinstall the assembled air filter.
7. Install the air cleaner cover, and tighten the two cover wing nuts securely.

# SERVICING YOUR HONDA ENGINE

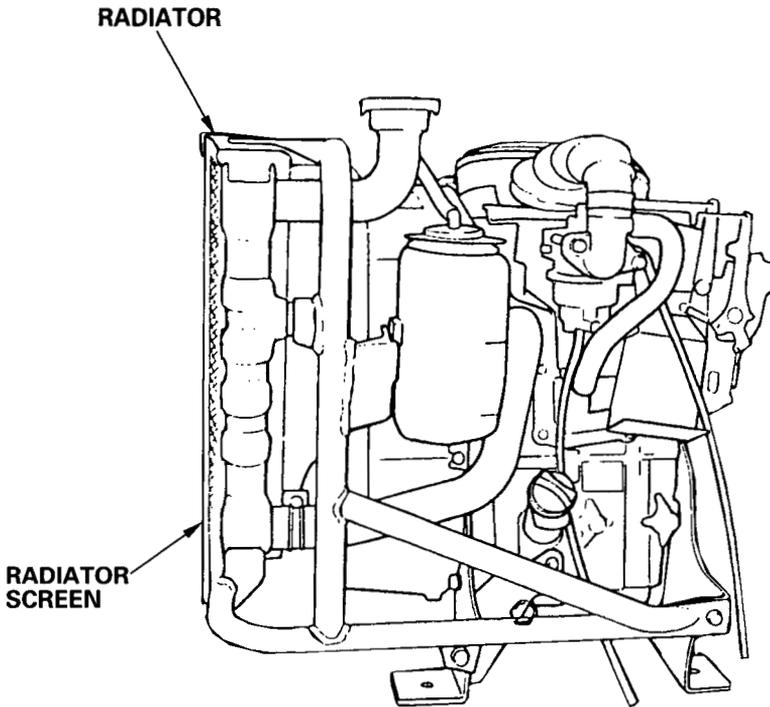
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## RADIATOR SCREEN INSPECTION

If the engine has been running, the radiator will be very hot. Allow the radiator to cool before servicing.

Check the radiator screen to be sure it is clean and in good condition.

If the radiator screen is dirty or clogged, clean it as described on page 33.

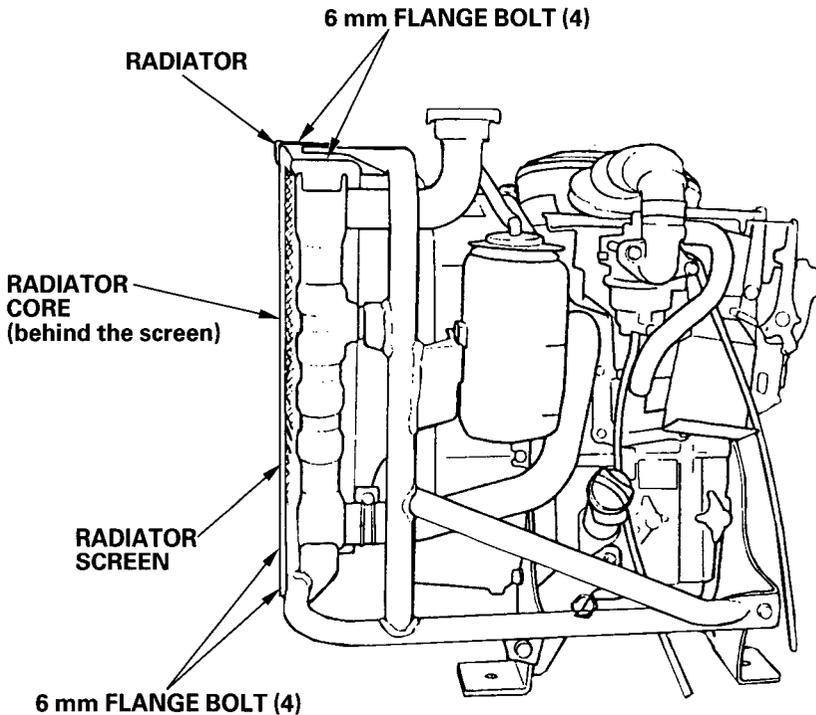


# SERVICING YOUR HONDA ENGINE

## RADIATOR SCREEN AND RADIATOR CORE SERVICE

If the engine has been running, the radiator will be very hot. Allow the radiator to cool before servicing.

1. Remove the four 6 mm flange bolts from the radiator screen, and remove the screen.
2. Clean debris from the screen and radiator core.
3. Install the radiator screen in the reverse order of removal.



# SERVICING YOUR HONDA ENGINE

## COOLANT LEVEL CHECK

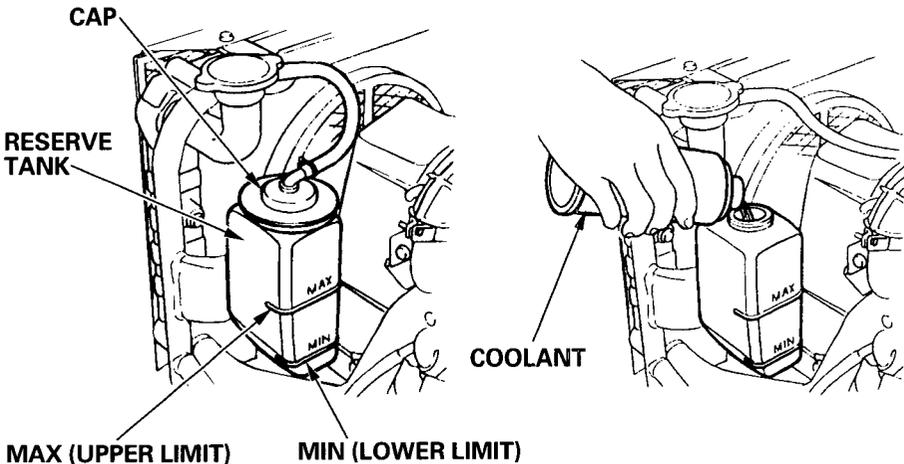
The engine protection system will automatically stop the engine if the coolant becomes excessively hot, which may occur if the coolant level is low.

### NOTICE

*If the cooling system is empty, or the coolant level is lower than the temperature sensor in the radiator, the engine protection system will not stop the engine, and the temperature warning light will not come on. Always check the coolant level before operation.*

Check the coolant level in the reserve tank. It should be between the MAX and MIN marks when the engine is at normal operating temperature.

If the coolant level is near the MIN mark, add a 50/50 solution of antifreeze and water to bring it up to the MAX mark. Refer to page 38 for coolant/antifreeze recommendations.



# SERVICING YOUR HONDA ENGINE

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If there is no coolant in the reserve tank, the cooling system should be checked for leaks and repaired if necessary. Coolant must then be added to the radiator and the reserve tank.

Wait until the engine is cool. Without pressing down on the cap, turn it counterclockwise until it stops. After any remaining pressure has been relieved, remove the cap by pressing down and again turning it counterclockwise. Add enough coolant to fill the the radiator, and reinstall the cap. Fill the reserve tank to the MAX mark after the engine reaches normal operating temperature.

## **⚠ WARNING**

Removing the radiator cap while the engine is hot can cause the coolant to spray out, seriously scalding you.

Always let the engine cool down before removing the radiator cap.

# SERVICING YOUR HONDA ENGINE

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## COOLANT CHANGE

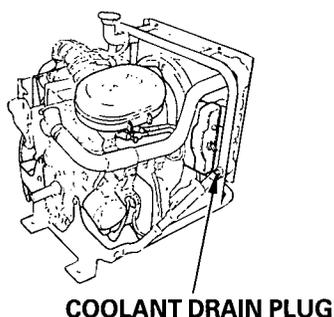
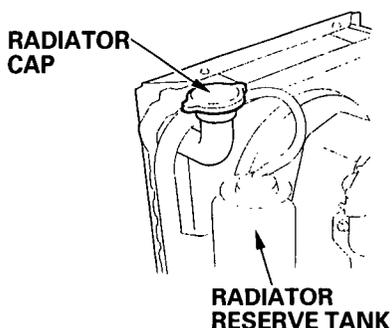
Replace coolant while the engine is cool. If the engine has been running, wait until the engine is cool before removing the radiator cap or drain plug.

### **⚠ WARNING**

Removing the radiator cap or drain plug while the engine is hot can cause the coolant to spray out, seriously scalding you.

Always let the engine cool down before removing the radiator cap or drain plug.

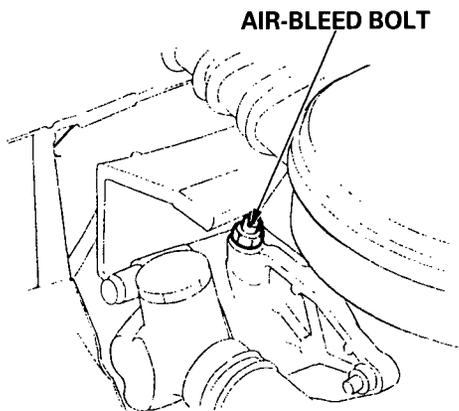
1. Remove the radiator cap, using the following procedure:  
Without pressing down on the cap, turn it counterclockwise until it stops. After any remaining pressure has been relieved, remove the cap by pressing down and again turning it counterclockwise.
2. Place a suitable container below the engine to catch the used coolant, then remove the coolant drain plug.
3. Allow the used coolant to drain completely, then reinstall the drain plug and tighten it securely.
4. Remove, empty, and reinstall the reserve tank.



# SERVICING YOUR HONDA ENGINE

5. Loosen the air-bleed bolt at the side of the cylinder head. This will allow air to escape when filling the cooling system.

6. Pour coolant into the radiator until the coolant level reaches the filler opening. Refer to page 38 for coolant/antifreeze recommendations. Tighten the air-bleed bolt as soon as coolant starts to run out in a steady stream, without bubbles.



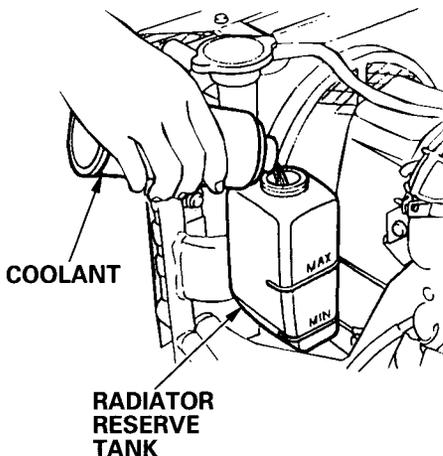
7. Put the radiator cap on the filler opening without tightening the cap. Start the engine, and let it run until the upper radiator feels warm.

8. Stop the engine and remove the radiator cap. Check the coolant level, and add more coolant to the radiator if necessary.

9. Again, put the radiator cap on the filler opening without tightening. Restart the engine and run it for a few minutes. Stop the engine, check the coolant level, and add more coolant to the radiator if necessary.

Repeat this procedure until the coolant level stabilizes, and the radiator remains full. Then install and tighten the radiator cap.

10. Fill the reserve tank to the MAX line.



# SERVICING YOUR HONDA ENGINE

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## COOLANT RECOMMENDATIONS

Use a high-quality ethylene glycol antifreeze that is specifically formulated for aluminum engines. Mix the antifreeze with low-mineral drinking water or distilled water.

A 50/50 mixture of ethylene glycol antifreeze and water is recommended for most temperatures, and it provides good corrosion protection. A higher concentration of antifreeze decreases cooling efficiency and is recommended if additional protection against freezing is needed. A concentration of less than 40% antifreeze will not provide enough corrosion protection.

### NOTICE

*The wrong type of antifreeze, hard water, or salt water can cause corrosion damage in the engine.*

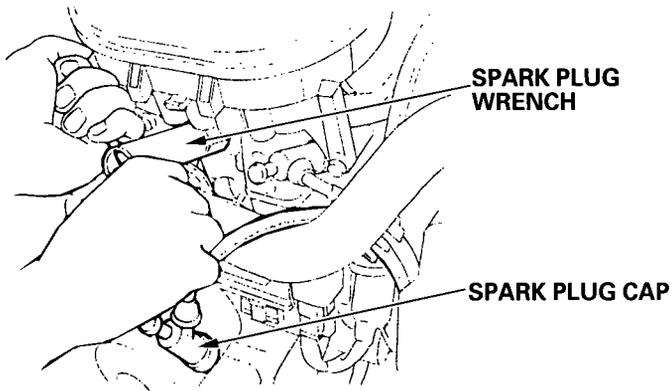
## SPARK PLUG SERVICE

Recommended spark plugs: BPR4HS (NGK)

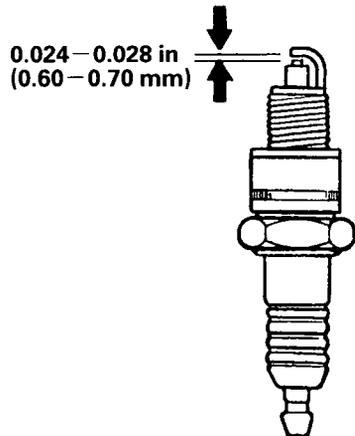
### NOTICE

*Incorrect spark plugs can cause engine damage.*

1. Disconnect the spark plug caps, and remove any dirt from around the spark plug area.
2. Remove the spark plugs with a 13/16-inch spark plug wrench.



3. Inspect the spark plugs. Replace them if the electrodes are worn, or if the insulator is cracked or chipped. Clean the spark plugs with a wire brush if you are going to reuse them.
4. Measure the spark plug electrode gap with a suitable gauge. The gap should be 0.024 – 0.028 in (0.60 – 0.70 mm). Correct the gap, if necessary, by carefully bending the side electrode.
5. Install the spark plugs carefully, by hand, to avoid cross-threading.



# SERVICING YOUR HONDA ENGINE

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6. After each spark plug seats, tighten with a 13/16-inch spark plug wrench to compress the washer.

If reinstalling the used spark plugs, tighten 1/8 – 1/4 turn after each spark plug seats.

If installing new spark plugs, tighten 1/2 turn after each spark plug seats.

## NOTICE

*A loose spark plug can overheat and damage the engine.*

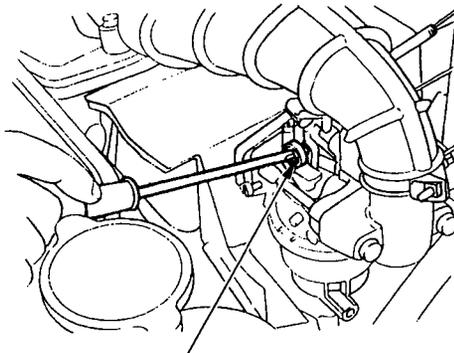
*Overtightening the spark plug can damage the threads in the cylinder head.*

7. Attach the spark plug caps.

## IDLE SPEED ADJUSTMENT

1. Start the engine outdoors, and allow it to warm up to operating temperature.
2. Move the control lever to its slowest position.
3. Turn the throttle stop screw to obtain the standard idle speed.

Standard idle speed:  $1,300 \begin{smallmatrix} +200 \\ -0 \end{smallmatrix}$  rpm



**THROTTLE STOP SCREW**

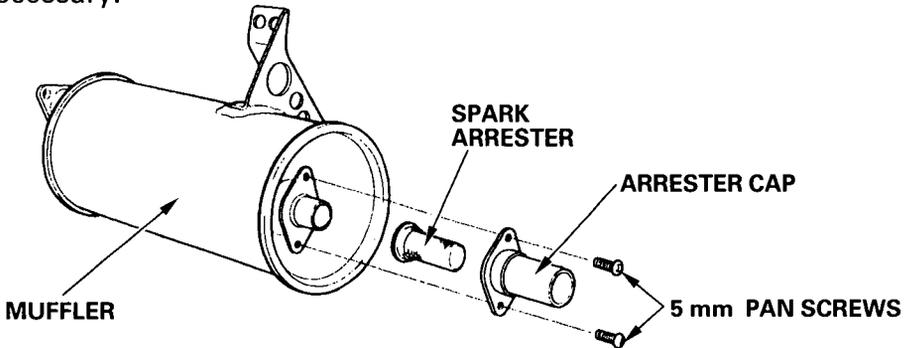
## SPARK ARRESTER SERVICE (optional equipment)

Your engine is not factory-equipped with a spark arrester. In some areas, it is illegal to operate an engine without a spark arrester. Check local laws and regulations. A spark arrester is available from authorized Honda servicing dealers.

The spark arrester must be serviced every 100 hours to keep it functioning as designed.

If the engine has been running, the muffler will be very hot. Allow the muffler to cool before servicing the spark arrester.

1. Loosen two 5 mm pan screws on the arrester cap.
2. Remove the arrester cap, then pull out spark arrester, taking care not to damage the wire mesh.
3. Check the muffler exhaust port for carbon deposits; clean if necessary.



4. Use a brush to remove carbon deposits from the spark arrester screen. Be careful to avoid damaging the screen.

The spark arrester must be free of breaks and holes. Replace the spark arrester if it is damaged.



5. Install the spark arrester and the arrester cap in the reverse order of disassembly.

# HELPFUL TIPS & SUGGESTIONS

## STORING YOUR ENGINE

### Storage Preparation

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

#### *Cleaning*

If the engine has been running, allow it to cool for at least half an hour before cleaning. Clean all exterior surfaces, touch up any damaged paint, and coat other areas that may rust with a light film of oil.

#### **NOTICE**

- *Using a garden hose or pressure washing equipment can force water into the air cleaner or muffler opening. Water in the air cleaner will soak the air filter, and water that passes through the air filter or muffler can enter the 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.*

#### *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 engine 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.

## HELPFUL TIPS & SUGGESTIONS

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The *Distributor's Limited Warranty* does not cover fuel system damage or engine performance problems resulting from neglected storage preparation.

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

### **ADDING A FUEL STABILIZER TO EXTEND FUEL STORAGE LIFE**

When adding a fuel 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.

1. Add fuel stabilizer following the manufacturer's instructions.
2. After adding a fuel stabilizer, run the engine outdoors for 10 minutes to be sure that treated gasoline has replaced the untreated gasoline in the carburetor.
3. Stop the engine, and if the fuel tank is equipped with a fuel valve, move the fuel valve lever to the CLOSED or OFF position.

# HELPFUL TIPS & SUGGESTIONS

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## DRAINING THE FUEL TANK AND CARBURETOR

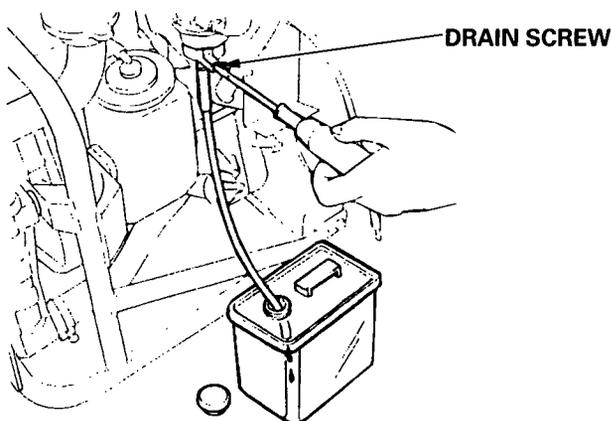
1. Disconnect the fuel line to the engine, and drain the fuel tank into an approved gasoline container. If the fuel tank is equipped with a valve, turn the fuel valve to the OPEN or ON position to enable draining. After draining is completed, reconnect the fuel line.
2. Loosen the carburetor drain screw, and drain the carburetor into an approved gasoline container. After draining is completed, tighten the carburetor drain screw.

### **⚠ WARNING**

Gasoline is highly flammable and explosive.

You can be burned or seriously injured when handling fuel.

- Keep heat, sparks and flame away.
- Handle fuel only outdoors.
- Wipe up spills immediately.



### ***Engine Oil***

1. Change the engine oil (see page 26).
2. Remove the spark plugs (see page 39).
3. Pour a tablespoon (5–10 cc) of clean engine oil into the cylinders.
4. Crank the engine several revolutions to distribute the oil.
5. Reinstall the spark plugs.

### **Storage Precautions**

If your engine 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 lever in the OFF position to reduce the possibility of fuel leakage.

# HELPFUL TIPS & SUGGESTIONS

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Position the equipment so the engine is level. Tilting can cause fuel or oil leakage.

With the engine and exhaust system cool, cover the engine 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 engine, promoting rust and corrosion.

Remove the battery and store it in a cool, dry place. Recharge the battery once a month while the engine is in storage. This will help to extend the service life of the battery.

## **Removal From Storage**

Check your engine as described in the *BEFORE OPERATION* 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 cylinders were coated with oil during storage preparation, the engine may smoke briefly at startup. This is normal.

## TRANSPORTING

If the engine has been running, allow it to cool for at least 15 minutes before loading the engine-powered equipment on the transport vehicle. A hot engine and exhaust system can burn you and can ignite some materials.

Keep the engine level when transporting to reduce the possibility of fuel leakage.

If the fuel tank is equipped with a fuel valve and/or vent valve, turn them to the CLOSED or OFF position.

# TAKING CARE OF UNEXPECTED PROBLEMS

<b>ENGINE WILL NOT START</b>	<b>Possible Cause</b>	<b>Correction</b>
1. Electric starting: Check battery and fuse.	Battery discharged.	Recharge battery.
	Fuse burnt out.	Replace fuse (p. 51).
2. Check control positions.	Fuel valve OFF. (if equipped)	Move lever to ON.
	Choke OPEN.	Move lever to START position unless engine is warm.
	Engine switch OFF.	Turn engine switch to ON.
3. Check fuel.	Out of fuel.	Refuel.
	Bad fuel; engine stored without treating or draining gasoline, or refueled with bad gasoline.	Drain fuel tank and carburetor (p. 44). Refuel with fresh gasoline.
4. Remove and inspect spark plugs.	Spark plugs faulty, fouled, or improperly gapped.	Clean, gap, or replace spark plugs (p. 39).
	Spark plugs wet with fuel (flooded engine).	Dry and reinstall spark plugs. Start engine with control lever in FAST position.
5. Take engine to an authorized Honda servicing dealer, or refer to shop manual.	Carburetor malfunction, ignition malfunction, valves stuck, etc.	Replace or repair faulty components as necessary.

<b>ENGINE STARTS BUT IMMEDIATELY STOPS</b>	<b>Possible Cause</b>	<b>Correction</b>
Check alert light.	Engine protection system activated.	Refer to page 50.

# TAKING CARE OF UNEXPECTED PROBLEMS

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<b>ENGINE LACKS POWER</b>	<b>Possible Cause</b>	<b>Correction</b>
1. Check air filter.	Filter elements clogged.	Clean or replace filter elements. (p. 30)
2. Check fuel	Bad fuel; engine stored without treating or draining gasoline, or refueled with bad gasoline.	Drain fuel tank and carburetor (p. 44). Refuel with fresh gasoline.
3. Take engine to an authorized Honda servicing dealer, or refer to shop manual.	Carburetor malfunction, ignition malfunction, valves stuck, etc.	Replace or repair faulty components as necessary.

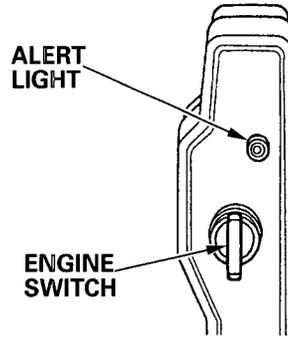
# TAKING CARE OF UNEXPECTED PROBLEMS

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## ENGINE PROTECTION SYSTEM ACTIVATED

If the alert light comes on, this means the engine protection system has been activated.

The engine protection system automatically stops the engine to prevent damage from lack of lubrication or overheating. The engine will not run if the oil pressure is too low or the coolant is too hot, and if restarted, the engine will immediately stop again.



Check the oil level, and add oil if needed (see page 25). Low oil pressure may be caused by a low oil level.

Check the coolant level in the reserve tank, and add coolant if needed (see pages 34 & 35).

Inspect the radiator screen (see pages 32 & 33). Clean it if blocked with dirt and debris.

Allow an overheated engine to cool for about half an hour before restarting. If restarted while overheated, the engine protection system will immediately stop the engine again.

### NOTICE

*If the cooling system is empty, or if the coolant level is lower than the temperature sensor in the radiator, the engine protection system will not stop the engine, and the alert light will not come on. Always check the coolant level before operation.*

If there are oil or coolant leaks, or if you are unable to correct the condition that has activated the engine protection system, take the engine to an authorized Honda servicing dealer.

# TAKING CARE OF UNEXPECTED PROBLEMS

## FUSE REPLACEMENT

The electric starter relay circuit and battery charging circuit are protected by a fuse. If the fuse burns out, the electric starter will not operate.

**SPECIFIED FUSE:** 15A (10A charge coil type)  
5A (3A charge coil type)

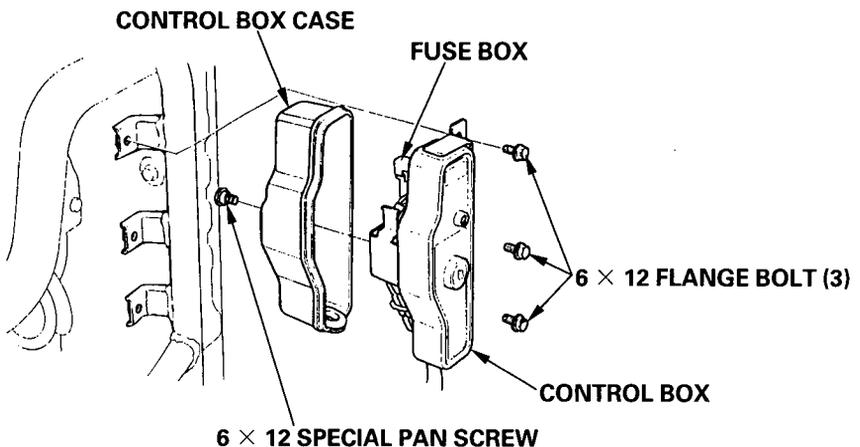
1. Remove the three  $6 \times 12$  mm flange bolts, and remove the control box.
2. Remove the  $6 \times 12$  mm special pan screw from the control box case.
3. Remove the control box case, and inspect the fuse.

If the fuse is burnt out, remove the fuse cover, then pull out and discard the burnt out fuse. Install a new specified fuse, and reinstall the fuse cover.

### NOTICE

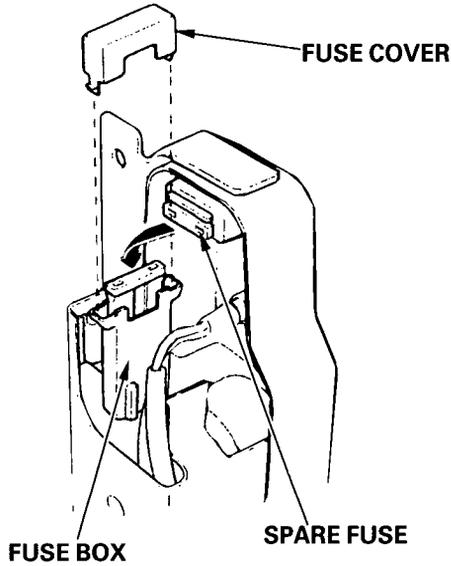
*Never use a fuse with a rating greater than specified. Serious damage to the electrical system or a fire could result.*

4. Install the control box in the reverse order of disassembly.



# TAKING CARE OF UNEXPECTED PROBLEMS

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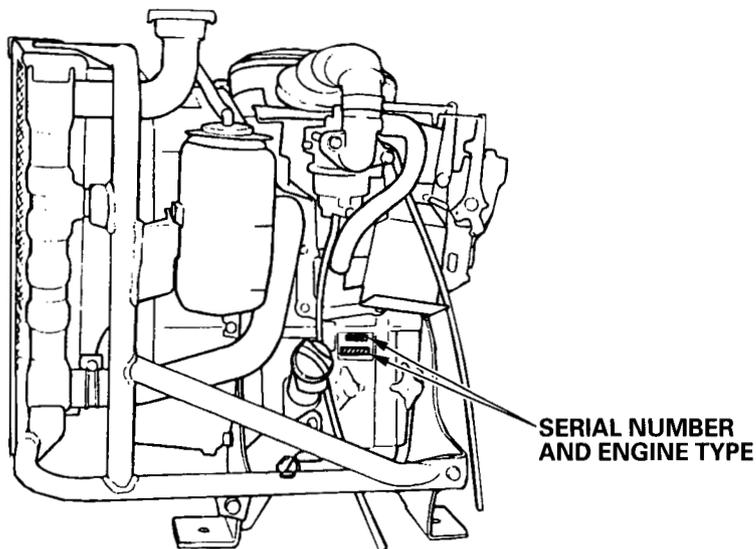


Frequent fuse failure usually indicates a short circuit or an overload in the electrical system. If the fuse burns out frequently, take the engine to a servicing Honda dealer for repair.

# TECHNICAL & CONSUMER INFORMATION

## TECHNICAL INFORMATION

### Serial Number Location



Record the engine serial number in the space below. You will need this serial number when ordering parts, and when making technical or warranty inquiries (see page 64 ).

Engine serial number: \_\_\_\_\_

# TECHNICAL & CONSUMER INFORMATION

## Battery Connections for Electric Starter

Use a 12-volt battery with an ampere-hour rating of at least 8 Ah.

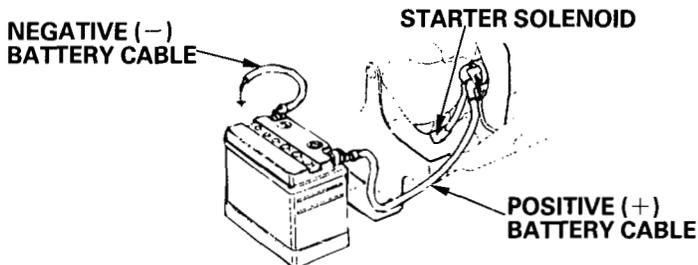
Be careful not to connect the battery in reverse polarity, as this will short circuit the battery charging system. Always connect the positive (+) battery cable to the battery terminal before connecting the negative (-) battery cable, so your tools cannot cause a short circuit if they touch a grounded part while tightening the positive (+) battery cable end.

### **⚠ WARNING**

A battery can explode if you do not follow the correct procedure, seriously injuring anyone nearby.

Keep all sparks, open flames, and smoking materials away from the battery.

1. Connect the battery positive (+) cable to the starter solenoid terminal as shown.
2. Connect the battery negative (-) cable to an engine mounting bolt, frame bolt, or other good engine ground connection.
3. Connect the battery positive (+) cable to the battery positive (+) terminal as shown.
4. Connect the battery negative (-) cable to the battery negative (-) terminal as shown.
5. Coat the terminals and cable ends with grease.



## Carburetor 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 plugs and cause hard starting. Operation at an altitude that differs from that at which this engine was certified, for extended periods of time, may increase emissions.

High altitude performance can be improved by specific modifications to the carburetor. If you always operate your engine at altitudes above 5,000 feet (1,500 meters), have your servicing dealer perform this carburetor modification. This engine, when operated at high altitude with the carburetor modifications for high altitude use, will meet each emission standard throughout its useful life.

Even with carburetor modification, engine horsepower will decrease about 3.5% for each 1,000-foot (300-meter) 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 5,000 feet (1,500 meters) with a modified carburetor may cause the engine to overheat and result in serious engine damage. For use at low altitudes, have your servicing dealer return the carburetor to original factory specifications.*

# **TECHNICAL & CONSUMER INFORMATION**

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## **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/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.

## Emission Control System Information

### *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.

Honda utilizes lean carburetor settings and other systems to reduce the emissions of carbon monoxide, oxides of nitrogen and hydrocarbons.

### *The U.S. and California Clean Air Acts*

EPA and California regulations require all manufacturers to furnish written instructions 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.

# TECHNICAL & CONSUMER INFORMATION

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## *Problems That May Affect Emissions*

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

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

## *Replacement Parts*

The emission control systems on your 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.

A manufacturer of an aftermarket part assumes the responsibility that the part will not adversely affect emission performance. The manufacturer or rebuilder of the part must certify that use of the part will not result in a failure of the engine to comply with emission regulations.

## *Maintenance*

Follow the maintenance schedule on page 23. 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.

# TECHNICAL & CONSUMER INFORMATION

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## Air Index

An Air Index Information hang tag/label is applied to engines certified to an emission durability time period in accordance with the requirements of the California Air Resources Board.

The bar graph is intended to provide you, our customer, the ability to compare the emissions performance of available engines. The lower the Air Index, the less pollution.

The durability description is intended to provide you with information relating to the engine's emission durability period. The descriptive term indicates the useful-life period for the engine's emission control system. See your *Emission Control Warranty* for additional information.

Descriptive Term	Applicable to Emissions Durability Period
Moderate	50 hours (0 – 65 cc) 125 hours (greater than 65 cc)
Intermediate	125 hours (0 – 65 cc) 250 hours (greater than 65 cc)
Extended	300 hours (0 – 65 cc) 500 hours (greater than 65 cc)

The Air Index Information hang tag must remain on the engine until it is sold. Remove the hang tag before operating the engine.

# TECHNICAL & CONSUMER INFORMATION

## Specifications

Length × Width × Height	20.3 × 19.3 × 20.9 in (515 × 490 × 530 mm)
Dry weight	99.2 lbs (45.0 kg)
Engine type	4-stroke, overhead camshaft, twin cylinder
Displacement [Bore × Stroke]	21.9 cu-in (359 cm <sup>3</sup> ) [2.3 × 2.7 in (58 × 68 mm)]
Max. output	12.3 hp (12.5 PS, 9.2 kW) at 3,600 rpm
Max. torque	19 lbf-ft (26 N·m, 2.63 kgf·m) at 3,000 rpm
Fuel consumption	0.51 lbs/hph (313 g/kWh, 230 PSh)
Cooling system	Liquid cooled
Coolant	2.1 US qt (2.0 ℓ, 1.8 Imp qt)
Ignition system	Transistorized magneto
PTO shaft rotation	Counterclockwise

## Tuneup

ITEM	SPECIFICATION	MAINTENANCE
Spark plug gap	0.024 – 0.028 in (0.60–0.70 mm)	Refer to page: 39
Valve clearance	IN: 0.12±0.02 mm (cold) EX: 0.20±0.02 mm (cold)	See your authorized Honda dealer
Other specifications	No other adjustments needed	

## Wiring Diagrams

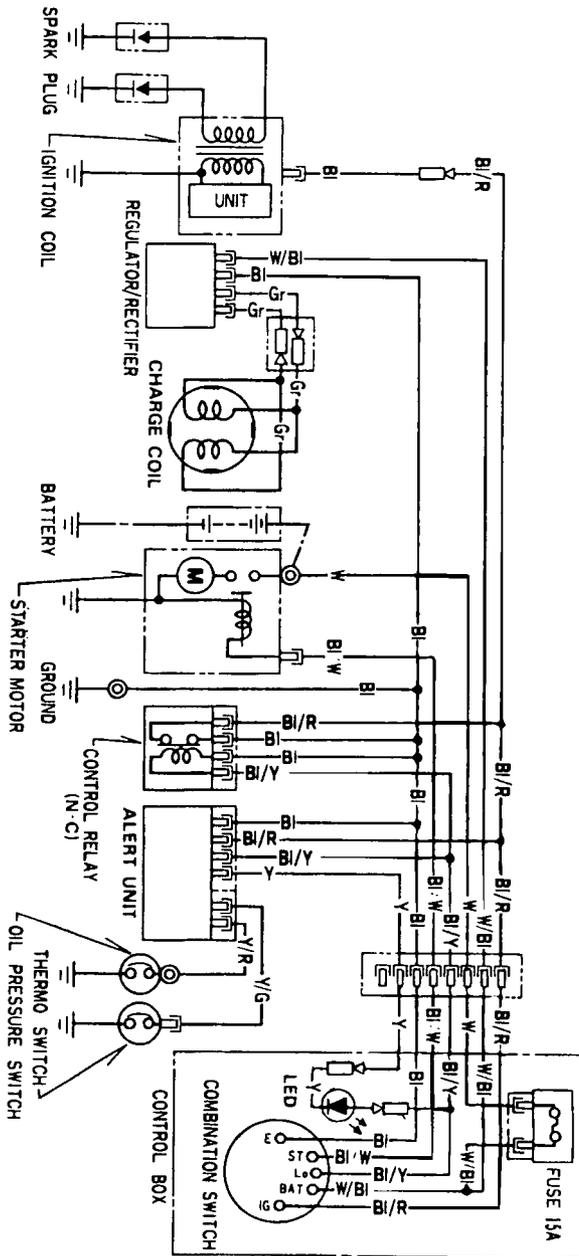
### 10A CHARGE COIL TYPE

COMBINATION SWITCH CONTINUITY

	IG	E	BAT	Lo	ST
OFF	○	○			
ON			○	○	
ST			○	○	○

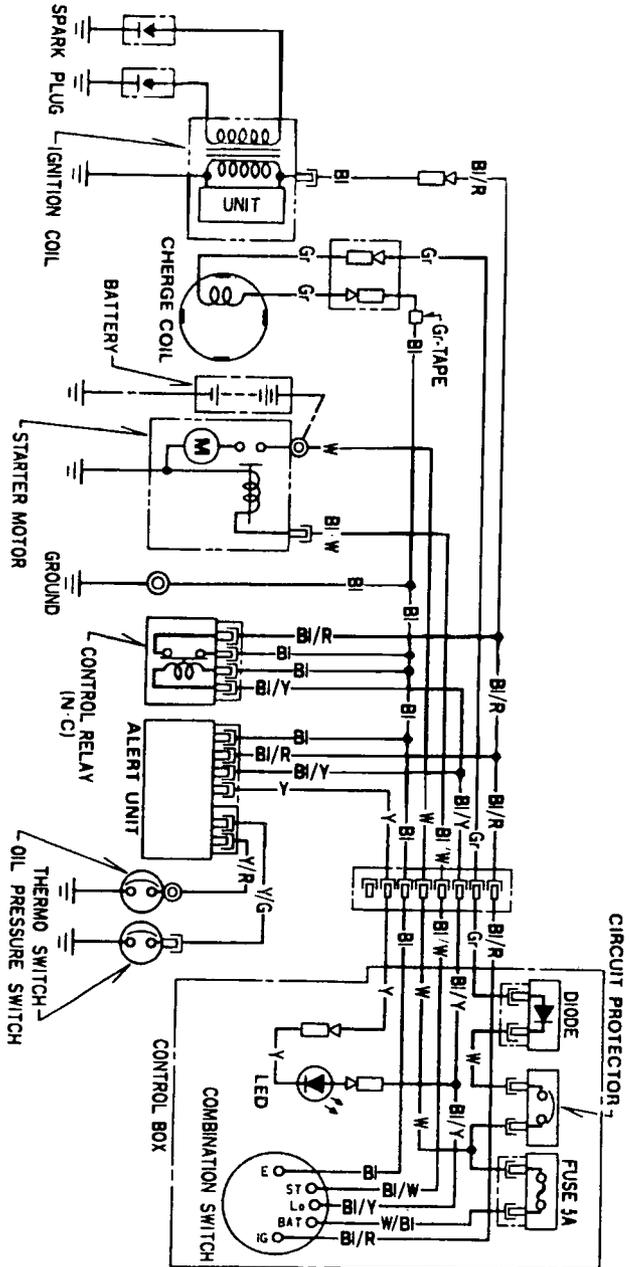
Bl	.....	BLACK	Br	.....	BROWN
Y	.....	YELLOW	0	.....	ORANGE
Bu	.....	BLUE	Lb	.....	LIGHT BLUE
G	.....	GREEN	Lg	.....	LIGHT GREEN
R	.....	RED	P	.....	PINK
W	.....	WHITE	Gr	.....	GRAY

**0030Z-ZA0-9200**



# TECHNICAL & CONSUMER INFORMATION

## 3A CHARGE COIL TYPE



**0030Z-ZA0-8100**

## CONSUMER INFORMATION

### **Honda Publications**

These publications will give you additional information for maintaining and repairing your engine. You may order them from your Honda engine dealer.

#### ***Shop Manual***

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

#### ***Parts Catalog***

This manual provides complete, illustrated parts lists.

# **TECHNICAL & CONSUMER INFORMATION**

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## **Warranty Service Information**

Servicing dealership personnel are 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. The Service Manager or General Manager can help. Almost all problems are solved in this way.

If you are dissatisfied with the decision made by the dealership's management, contact the Honda Power Equipment Customer Relations Office. You can write to:

American Honda Motor Co., Inc.  
Power Equipment Division  
Customer Relations Office  
4900 Marconi Drive  
Alpharetta, Georgia 30005-8847

Or telephone: (770) 497-6400

When you write or call, please give us this information:

- Model and serial number (see page 53 )
- Name of dealer who sold the engine to you
- Name and address of dealer who services your engine
- Date of purchase
- Your name, address and telephone number
- A detailed description of the problem

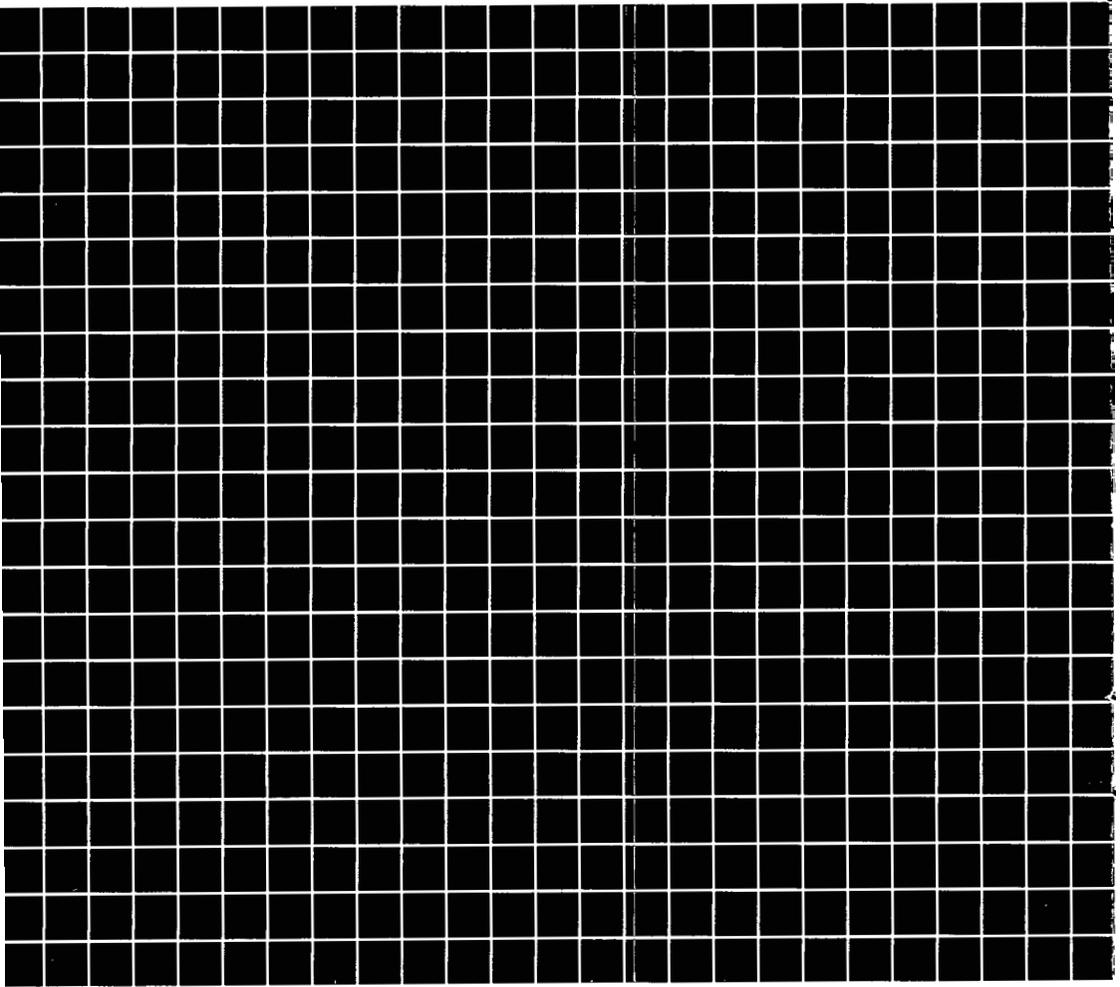
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## QUICK REFERENCE INFORMATION

Fuel	Type	Unleaded gasoline with a pump octane rating of 86 or higher (page 24).
Engine Oil	Type	SAE 10W-30, API SJ, for general use (page 28).
	Capacity	1.48 US qt (1.40 ℓ , 1.23 Imp qt)
Spark Plug	Type	NGK: BPR4HS
	Gap	0.024 – 0.028 in (0.60 – 0.70 mm) (page 39)
Carburetor	Idle speed	1,300 <sup>+200</sup> <sub>0</sub> rpm (page 40)
Maintenance	Each use	Check engine oil level. Check radiator coolant level. Check transmission oil level if applicable. Check air filter.
	First 20 hours	Change engine oil. Change transmission oil if applicable.
	Subsequent	Refer to the maintenance schedule on page 23.

# HONDA

The Power of Dreams



31ZA0753  
00X31-ZA0-7530

**EM3** K1 (AH) (英) (Y) (HC) 300.2001.05  
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