User Guide

Rail Joint Straightener

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Please note

Whilst Permaquip Limited has taken every care in preparing this User Guide it is intended as a technical guideline only. Save to the extent that there are statutory rights to the contrary, Permaquip accepts no liability in relation to any use or reliance made of any information in this User Guide.

All information, illustrations and specifications in this User Guide are based on the latest information available at the time of publication. The right is reserved to make changes at any time without notice.

Equipment operators and installers shall be responsible for ensuring that a safe working environment and safe systems of work are in place and in certain circumstances advice and permission from the controlling authority must be sought before any operation, installation or surveying work is carried out.

1 ISSUE AND REVISION RECORD

This document will be updated when necessary by the re-issue of the complete document.

Issue	Description	Date	Revised Page No.	Revised By.
02	Changes for new MD	31/12/2009	All	C.H.
03	General updates.	30/11/2015	All	M.S.

2 INTRODUCTION

The Permaquip™ Rail Joint Straightener (RJS) is a portable, one rail unit, capable of straightening both welded and fishplated rail joints.

The unit contains an integral power pack for simple operation. The high capacity ram is fitted with a graduated scale to read the actual rail deflection at the joint.

3 SAFE AND CORRECT USE

Please keep this User Guide for future reference.

To ensure safe and correct use of the Rail Joint Straightener the following should be noted:

Wear ear, eye, feet and hand protection when using the RJS. Additional Personal Protective Equipment (PPE) should be worn according to local regulations.

During transit the RJS should be secured and kept away from all electrified lines.

The RJS, or parts of, must be replaced if damage occurs. Do not use the RJS if any components are damaged.

Store the RJS in a secure position.

Ensure that all hydraulic components and couplings are clean. Retract the rams.

Before using, undertake a Manual Handling Risk Assessment and follow the assessment guidelines at all times. Use the handles provided.

Always use the correct, clean oil, as defined in the technical specification. The RJS has been filled and tested with clean, new hydraulic oil to this specification. It must be properly maintained and not contain contaminated oil. No liability will be accepted for failure or malfunction of the equipment if this condition is not met.

Always use the correct, clean filtered fuel, as defined in the technical specification. The RJS has been tested with clean, new fuel to this specification and then drained. Contaminated fuel must not be used. When fuel is left in the engine it should be ran every for 5 minutes every 4 to 6 weeks. No liability will be accepted for failure or malfunction of the equipment if this condition is not met.

Keep all components away from extreme temperatures.

The RJS is not obstructionless, so adequate protection must be used.

The RJS can affect track stability. Refer to the railway infrastructure for guidance.

Do not use the Hydraulic Hoses to move the RJS. Do not allow the hoses to kink, twist, curl or bend. Do not allow the hoses to come into contact with corrosive substances such as paint, oil, etc. Refer to Harsco Track Technologies for further advice.

Do not use the RJS for any other purpose than as described in the introduction.

Do not drag the RJS along the ballast.

Do not hold off the Brake Handle using mechanical means.

Stopping distances will greatly increase by icy or wet conditions; gradients; an increase in load; an increase in speed.

Dispose of used oil responsibly and in accordance with local regulations.

4 TECHNICAL SPECIFICATION

4.1 Physical Data for the RJS Main Components

	Full Assembly
Length	2025mm
Width	1750mm
Height	1310mm
Total Mass	317 kg

4.2 Oil Specification

The recommended oil for the ram and brake system is;

- Anti-wear hydraulic oil with an ISO viscosity grade 37.

Ensure that any alternatives used are to the same specification.

4.3 Fuel Specification

The fuel for the Power Pack engine is;

- Unleaded 95 RON petrol.

4.4 Operating Pressure

The maximum operating pressure of the RJS is;

- Pressure to lift a dipped joint (ram extended) 3,000 p.s.i. (20.7 MNm^{-2})
- Pressure to close (ram retracted) 500 p.s.i. (3.4 MNm^{-2})

4.5 Operating Performance

The performance limits of the RJS are;

- Ram force 50.15 tonnes
- Maximum force at rail joint 103 tonnes
- Hydraulic Pump 1.5 l/min at 1500 rpm
- Maximum joints per hour 40

4.6 Power Pack Engine Emissions

Do not use the Power Pack in confined spaces such as tunnels without adequate ventilation in place.

The Power Pack is fitted with a Honda GX160 engine, that is certified to meet the emissions shown below for 250 hours providing the correct maintenance is performed.

	g/hp.hr
Hydrocarbons	10.0
NO_X	10.0
CO	549

4.7 Power Pack Engine Noise Emissions

The noise emitted by the power pack has been measured at 86 dB(A) at a distance of 1m at all positions and 90 dB(A) at the operators position.

4.8 HAV

The HAV on the control lever has been measured as less than the action level of 2.5 m/s^2 and therefore no additional measures need to be taken into account.

4.9 Product Compliance

The Rail Joint Straightener complies with GM/RT1310.

The RJS complies with the following:

- Directive 2006/42/EC
  Safety of Machinery.

- Directive 93/68/EEC
  CE Marking.

PERMAQUIP

EC CERTIFICATE OF CONFORMITY

Certificate number: **PMQ**

Customer name:

Address:

CE

Customer Order No: **Permaquip Order No:**

Description of equipment: Rail Joint Straightener

Part No: 24173 **Date of manufature:**

Machine type: Hydraulic Equipment **Pads / cat No:** PA05/03682

Safe Working Load: - **Quantity:**

Manufacturing conformity examination: -

Serial numbers:

Responsible person: M. Sargent - Director - Permaquip Ltd.

Person empowered to sign on behalf of the responsible person: M. Sheppard BEng - Engineering Manager
M. Ford - Production Manager
P. Harris - Stores Co-ordinator and Inspector

National standards and technical specifications applicable: Machinery Directive 2006/42/EC

Signed by: **Signature:** **Date Signed:**

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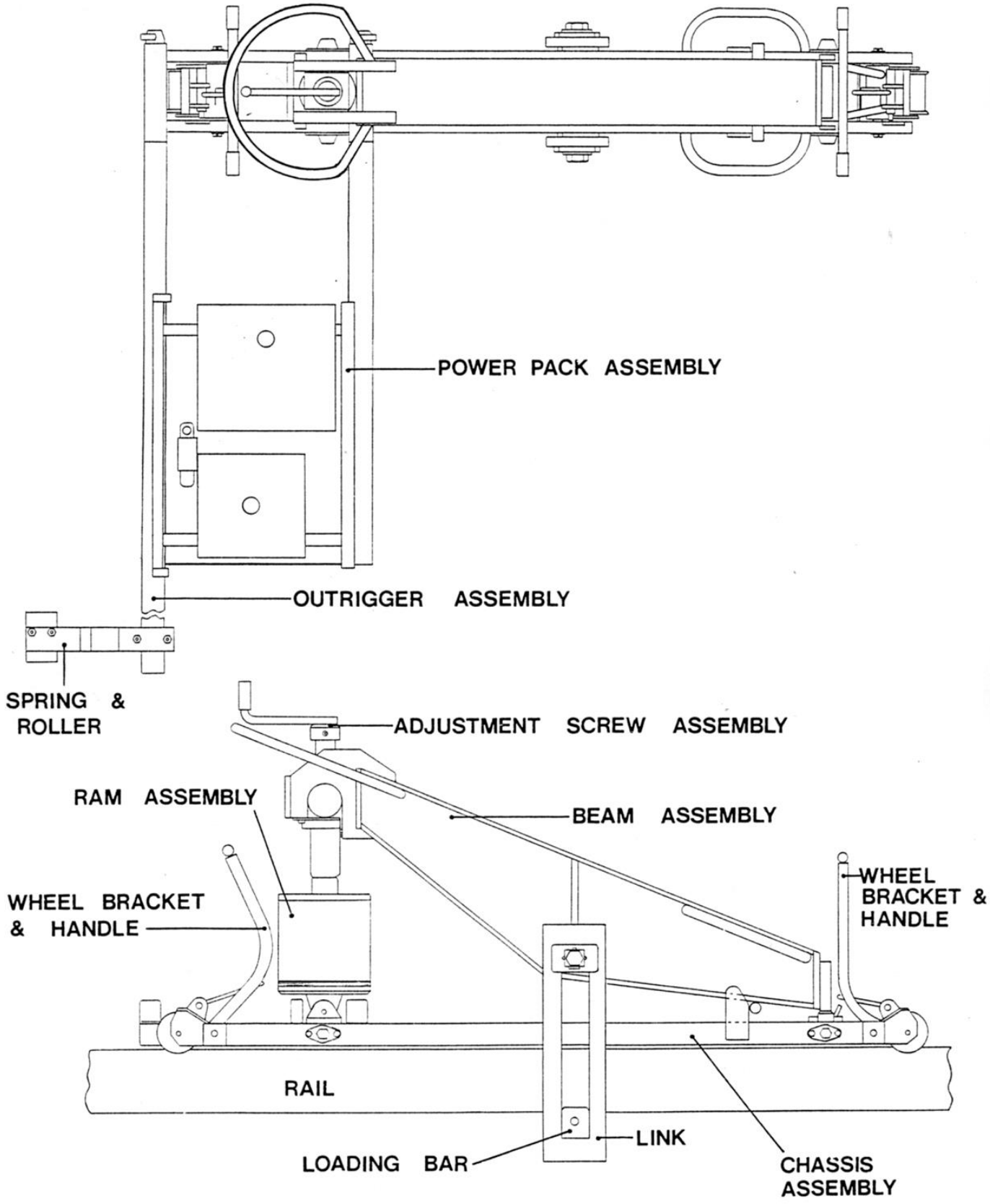
Title:	EC Declaration of Conformity Form	Reference:	BMS-21
Version:	2.1	Issue Date:	23/09/2015
Page	1 of 1	Next Review:	23/09/2018

5 GENERAL LAYOUT

The following shows the main components of the RJS.



6 OPERATING INSTRUCTIONS

The following procedure outlines the correct method for operation.

Should any of the checks fail do not use the equipment.

All work should only be performed by competent personnel.

Always follow local regulations.

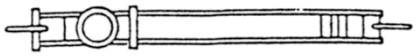
Observe Manual Handling Regulations.

6.1 Pre-use Checks

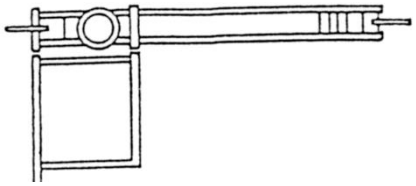
1. Check engine oil level. Fill if required using the correct specification and to the required level.
2. Check engine fuel level. Fill if required using the correct specification and to the required level.
3. Check hydraulic oil tank level. Fill if required using the correct specification and to the required level.
4. Check that there are no loose fasteners, oil leaks and general damage.
5. Check the hydraulic hoses are not damaged.
6. Note that new hoses are delivered empty of hydraulic oil.
7. Check the quick release couplings are free of damage and clean. Replace if damaged.
8. Check that the brakes are on and come off when the brake handle is moved. Check that the brakes go back on when the handle is released.

6.2 Assembly

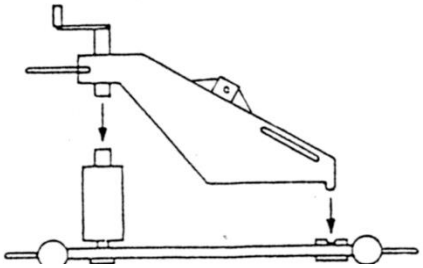
1. Place the chassis assembly onto the rail to be straightened.



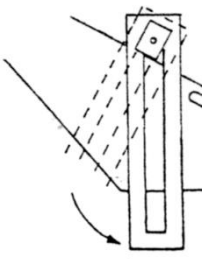
2. Locate the outrigger into the chassis assembly.



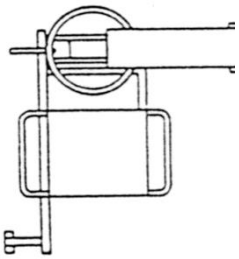
3. Ensure that the pins are located and that the wheels are seated onto the railheads.
4. Place the lifting beam onto the wheel frame.



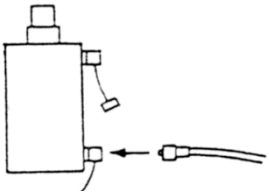
5. Ensure that the pivot end of the lifting beam is located in the pivot block groove.
6. Ensure that the head of the ram and the socket of the adjusting screw are correctly seated.
7. Locate the side links on the lifting beam.



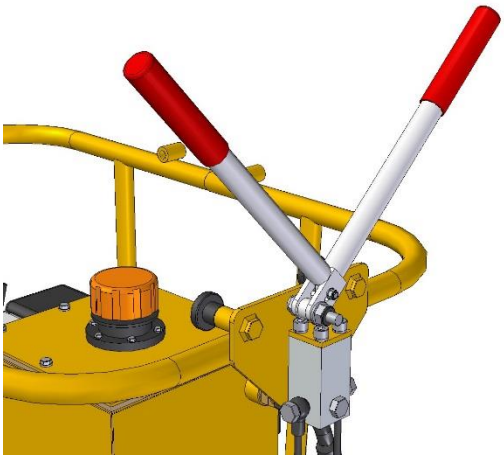
8. Locate the power pack onto the outrigger, ensuring that it is located into the blocks.



9. Connect the hydraulic power pack hoses to the ram using the quick release connectors.



10. Connect the brake handle assembly onto the power pack frame and secure with the thumbnuts provided. Note that the brake hoses are permanently connected. The brake handle assembly can be operated from either side of the equipment and are failsafe.



6.3 Starting the Engine

1. Ensure that the directional control valve on the power pack is in the neutral position.
2. Turn on the fuel valve.
3. Start the engine (see section Honda Engine Owners Manual).
4. When the engine has warmed up, set the throttle to the desired speed.
5. Check the operation of the hydraulic system. Ensure that the ram scale returns to zero when the pressure is released.

6.4 Stopping the Engine

1. Move the throttle to low revs.
2. Close the fuel tap.

6.5 Welded Joints – Flash Butt and Thermit

Before straightening Thermit welds, it must be ensured that the welds have been recently visually examined for flaws and other defects. Any welds **not** so examined must **not** be straightened, or marked so.

If flaws or defects are found to be present, the weld must **not** be straightened but urgently replaced under the infrastructure maintenance procedures.

Provision must be made for broken welds (which can still occur when straightening), i.e. clamp plates as a temporary measure or access to a Thermit welding team. On any CWR site a closer rail of appropriate section and length **must** be available for welding. It is not recommended that welded joints with dips in excess of 3mm be straightened.

Ensure that the weld is lifted to a hog (or overlift) of 1mm (over a 1 metre straight edge) to permit any grinding required to take place (without hollow grinding).

6.6 Rail Breakages

During joint straightening, dormant faults can be activated leading to breakages. Pre-inspection should reduce breakages very significantly.

Thermit welds on occasions have hidden faults where breakages can still occur. The incidence is on average much less than 1%.

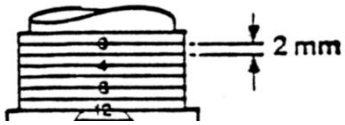
When programming work it is necessary to ensure that a Thermit weld team is available on an accessible site nearby, equipped to deal with a breakage during the possession. An emergency closer rail is of course required and must also be available on site.

Where this is not practical then emergency clamp plates are necessary and must be on site if needed.

Flash butt failures are a comparative rarity but can still occur. This also requires the above procedures to be followed.

6.7 Straightening Procedure

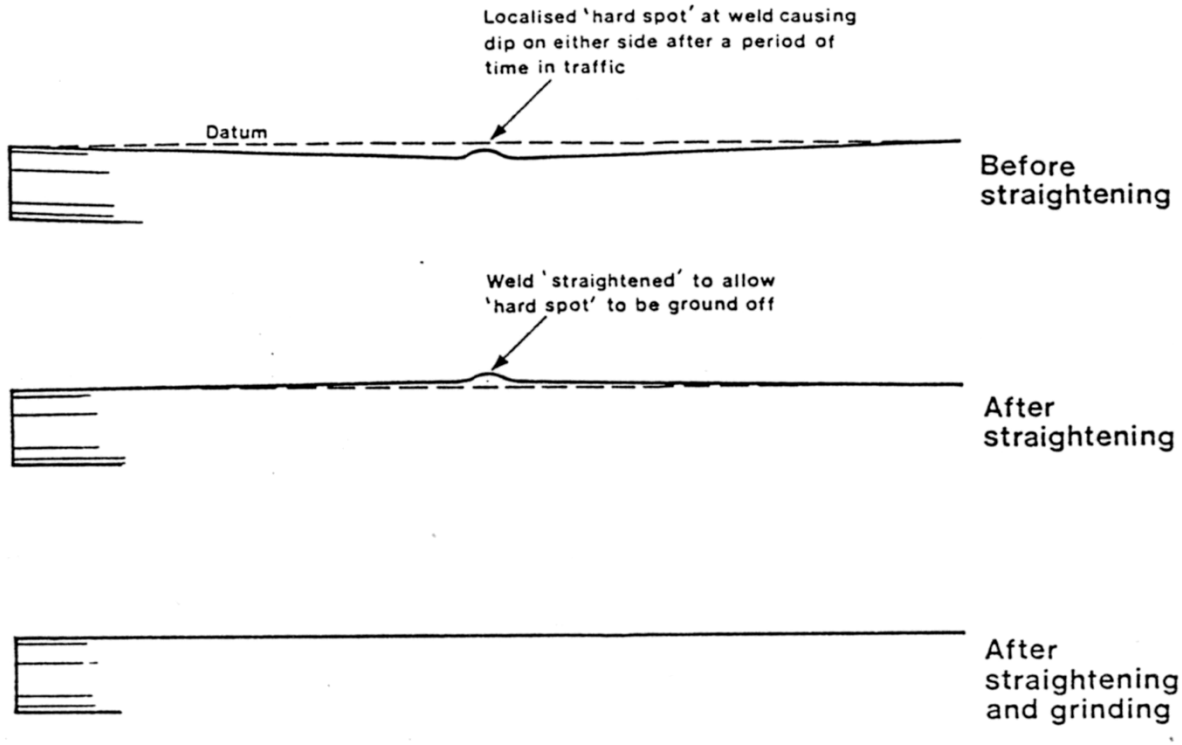
1. Ensure that the directional control valve on the power pack is in the neutral position.
2. Locate the RJS centrally over the joint.
3. Place one hand on the locator end wheel bracket handle, holding the handle firmly downwards. Remove the wheel locking pin with the other hand. Then with both hands on the handle, carefully lower the RJS off the wheel onto the lifting pad.
4. Lower the ram end of the RJS off the wheel onto the lifting pad, as described above.
5. Position the side links with the toe under the rail head. Locate the load bar securely by inserting through the side links and turning by 90° to lock into place.
6. Turn the adjusting screw until the RJS is firmly clamped to the rail, the pads are firmly down and the load bar is firmly in contact with the rail head.
7. Refer to the infrastructure owner's specification able to determine the required lift.
8. Operate the hydraulic control valve to lift to the position of the required lift. Note that the scale on the ram is graduated in 2mm steps and that the lift is better if applied in stages.



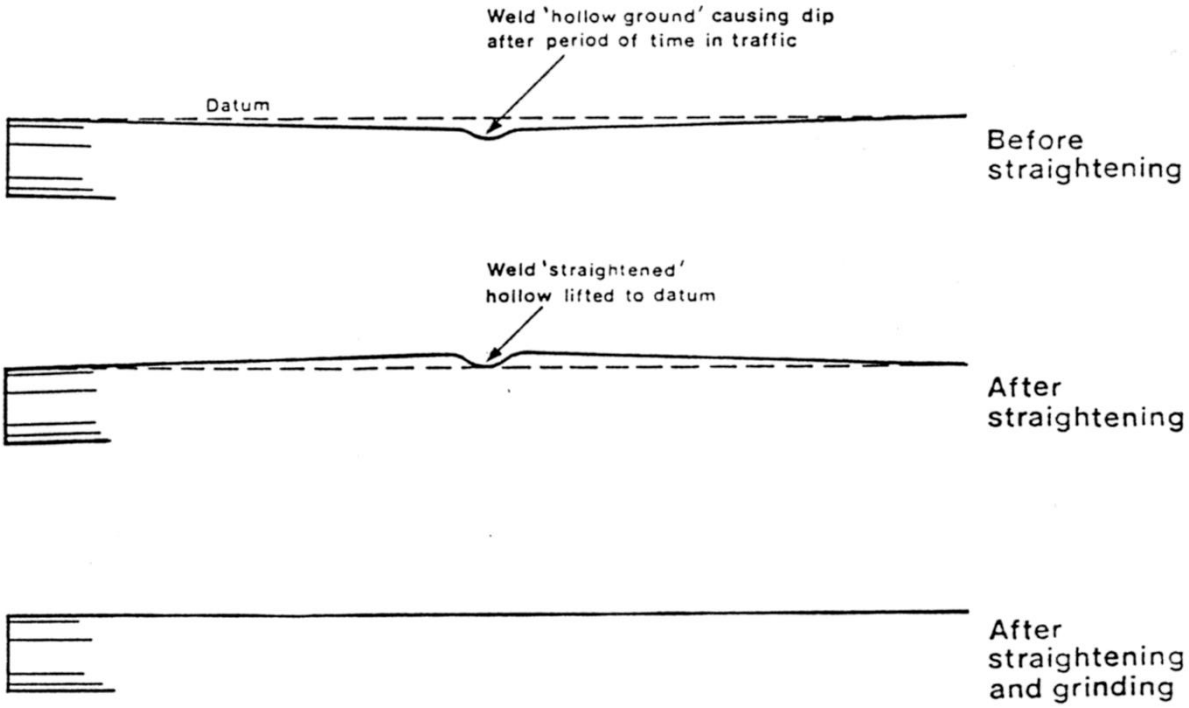
9. Hold the lift for at least 10 seconds. Loosely pack both joint sleepers in the lifted condition.
10. Release the pressure **slowly**.
11. Slacken the adjusting screw and remove the lift bar.
12. Raise the ram end of the RJS onto the wheels by carefully pushing the wheel handle bracket downwards. Keeping one hand on the handle, locate the wheel locking pin into position.
13. Raise the locator end of the RJS onto the wheels as described above.
14. Lock the wheels in position with the securing pins and move the RJS off the joint. Thoroughly pack at this stage under both joint sleepers. Check the adjacent sleepers and pack as required.
15. Check the joints after straightening to ensure the correct amount of hog or overlift has been applied
16. Note that where the joints are square, it is better to treat both joints at the same time.

6.8 Combining Straightening and Grinding

Flash butt weld, typical example.



Thermit weld, typical example.



7 MAINTENANCE AND TEST

All work should only be performed by competent personnel.

Always follow local regulations.

Observe Manual Handling Regulations.

7.1 Prior to despatch to site

1. Always kept the hydraulic fittings clean, especially the self sealing, quick release couplings. Replace all dust caps immediately after the couplings are disconnected.
2. Check the hydraulic oil level and top up using the correct oil, as specified in the Technical Specification.
3. Inspect the hydraulic hoses and pipes for visible signs of damage. Replace as required.
4. Place the RJS onto a test rail to simulate straightening a joint. Check that the pressure gauge is reading 3000 p.s.i. If the pressure gauge shows any other reading then the hydraulic system must be inspected and adjusted.
5. Clean the adjusting screw and lightly oil.
6. Inspect the load bar for damage and ensure that it will locate correctly on the side links. Ensure that the side links are free from burred edges.
7. Check that the wheels rotate freely.
8. Check that all fasteners are secure. Tighten if required.
9. Check that the pins are secure and in good condition. Replace as required.
10. Check that the brakes are on and come off when the brake handle is moved. Check that the brakes go back on when the handle is released.
11. If the brakes do not come off when the brake handle is operated, then follow the following procedure:
    - With the oil gun provided, push onto the fill screw located on the brake handle assembly.
    - Slightly undo this fill screw and push the oil gun to allow oil into the master cylinder. The brake handle will rise until the cylinder is full. Once full, tighten the fill screw and remove the oil gun.
    - Undo the bleed screw, also located on the brake handle assembly, until a small amount of oil comes out. This will remove any residual pressure in the system.
    - Recheck the brakes operate as previously described.

7.2 Weekly Maintenance/Safety Checks

1. Check the condition of the self sealing, quick release couplings. Replace if damaged.
2. Check the hydraulic hoses and pipes for visible signs of damage. Replace as required.
3. Check the security of the ram pin. Tighten as required.
4. Check the security of the beam resisting block. Tighten or replace as required.
5. Inspect the link plates for signs of distortion and cracking. Replace as required.
6. Check the condition of both wheel brackets and handles. Pay particular attention to the condition and operation of the locking pins.

7.3 Annual/every 250 hours of running (which ever occurs first)

1. Drain off the hydraulic oil.
2. Remove the suction strainer and filler from the hydraulic oil tank and clean.
3. Check the return line filter indicator and if necessary replace the filter element.
4. Clean out any silt from the hydraulic oil tank.
5. Refit the suction and filler strainer. Refill the tank with clean hydraulic oil, as specified in the Technical Specification.
6. Check the condition of the engine anti-vibration mounts. Replace as required.
7. Place the RJS on a flat, level test track. With the brakes on, connect a load cell to the frame and pull horizontally, aligned with the track. The brakes should prevent the wheels from turning when the load cell reads a minimum of 22kg.

Permaquip Ltd offer a testing and maintenance service – please contact us for further details.

8 TRAINING

Persons that will operate, maintain and test the Rail Joint Straightener should undertake a programme of training. This programme of training should include the following aspects:

- Product familiarisation.
- Component location and function.
- Product preparation.
- Safe and Correct Use.
- Maintenance.
- Testing.
- Practical experience.

Permaquip Ltd offer a training service – please contact us for further details.

9 ORDERING

DESCRIPTION		PADS Cat. No.	PART NO
Rail Joint Straightener		PA05/03682	24173

For spare parts please see the Spare Parts List.

Please contact Permaquip Ltd for further information and support.

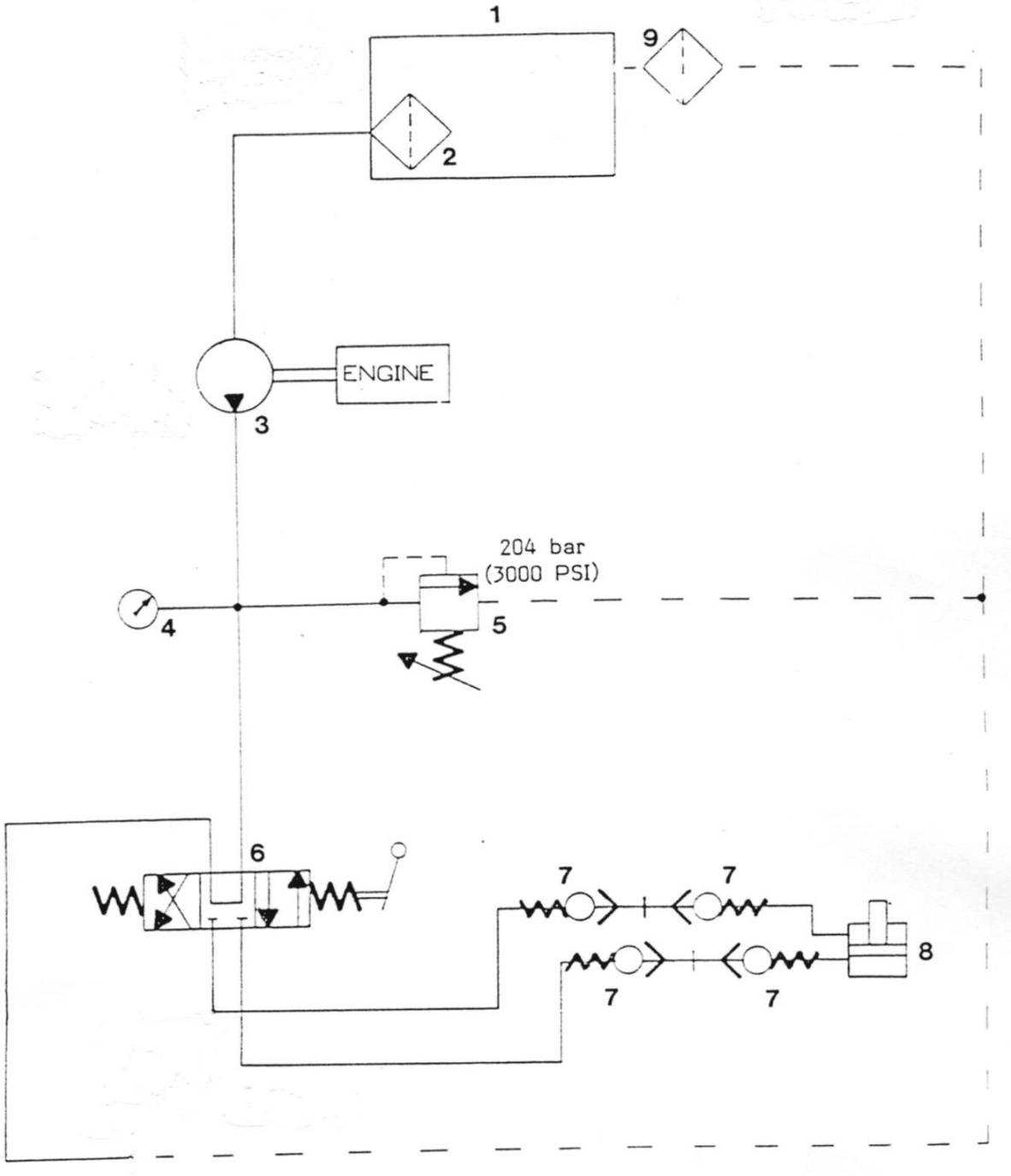
Our contact details are shown on the front of this User Guide.

In order to avoid delay and to have your orders fulfilled promptly,

Please telephone, e-mail, fax or write giving the following information:

1. **Company name.**
2. **Contact details.**
3. **Invoicing and delivery details.**
4. **Purchase order number.**
5. **Method of delivery.**
6. **Part number, description and quantity for each item.**

10 HYDRAULIC CIRCUIT



Item	Quantity	Description
1	1	Hydraulic tank
2	1	Suction filter
3	1	Hydraulic pump
4	1	Pressure gauge
5	1	Relief valve
6	1	Control valve
7	4 pairs	Quick release coupling
8	1	Hydraulic ram
9	1	Return line filter

Safety Data Sheet
according to 1907/2006/EC, Article 31

Printing date 01.06.2007 Revision: 01.06.2007

1 Identification of the substance/preparation and of the company/undertaking

· **Product details**

· **Trade name: RENOLIN CL37**

· **Article number:** 600017279
· **Application of the substance / the preparation** Hydraulic fluid

· **Manufacturer/Supplier:**
FUCHS LUBRICANTS (UK) PLC.
New Century Street
Hanley
Stoke-on-Trent, Staffordshire, ST1 5HU
UK
Emergency telephone: (UK) 08701 200400
e-mail: product.safety@fuchs-oil.com

· **Further information obtainable from:** Product safety department.
· **Information in case of emergency:** Emergency telephone: (UK) 08701 200400

2 Hazards identification

· **Hazard description:** Not applicable.
· **Information concerning particular hazards for human and environment:** Not applicable.

3 Composition/information on ingredients

· **Chemical characterization:**
· **CAS No. Description**
Highly refined mineral oil
· **Identification number(s)**
· **Additional information:** A blend of highly refined mineral oils with multifunctional additives

4 First aid measures

· **General information:** No special measures required.
· **After inhalation:** Supply fresh air; consult doctor in case of complaints.
· **After skin contact:**
Immediately wash with water and soap and rinse thoroughly.
If skin irritation continues, consult a doctor.
· **After eye contact:**
Check for and remove any contact lenses.
Rinse opened eye for several minutes under running water. Then consult a doctor.
· **After swallowing:**
Wash mouth out with water
Do not induce vomiting; call for medical help immediately.
· **Information for doctor:**
High pressure injection injuries through the skin require prompt surgical intervention and possibly steroid therapy, to minimise tissue damage and loss of function. Because entry wounds are small and do not reflect the seriousness of the underlying damage, surgical exploration to determine the extent of involvement may be necessary. Local anaesthetics or hot soaks should be avoided because they can contribute to swelling, vasospasm and ischaemia. Prompt surgical decompression, debridement and evacuation of foreign material should be performed under general anaesthetics, and wide exploration is essential.

5 Fire-fighting measures

· **Suitable extinguishing agents:**
CO2, powder or water spray. Fight larger fires with water spray or alcohol resistant foam.
· **For safety reasons unsuitable extinguishing agents:** Water with full jet

(Contd. on page 2)

(Contd. of page 1)

· **Protective equipment:**
Wear self-contained respiratory protective device.
Wear fully protective suit.

6 Accidental release measures

· **Person-related safety precautions:** Particular danger of slipping on leaked/spilled product.
· **Measures for environmental protection:**
Do not allow product to reach sewage system or any water course.
Do not allow to penetrate the ground/soil.
· **Measures for cleaning/collecting:**
Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust).
Send for recovery or disposal in suitable receptacles.
· **Additional information:** No dangerous substances are released.

7 Handling and storage

· **Handling:**
· **Information for safe handling:** Prevent formation of aerosols.
· **Information about fire - and explosion protection:** No special measures required.

· **Storage:**
· **Requirements to be met by storerooms and receptacles:** Prevent any seepage into the ground.
· **Information about storage in one common storage facility:** Store away from oxidizing agents.
· **Further information about storage conditions:** Store in cool, dry conditions in well sealed receptacles.

8 Exposure controls/personal protection

· **Additional information about design of technical facilities:** No further data; see item 7.

· **Ingredients with limit values that require monitoring at the workplace:**	
Highly refined mineral oil	
OEL	Short-term value: 10 mg/m³ Long-term value: 5 mg/m³

· **Additional information:** The lists valid during the making were used as basis.

· **Personal protective equipment:**
· **General protective and hygienic measures:**
Wash hands before breaks and at the end of work.
Do not carry product impregnated cleaning cloths in trouser pockets.
Avoid close or long term contact with the skin.
Do not eat, drink, smoke or sniff while working.
Avoid contact with the eyes.
· **Respiratory protection:** Not required.
· **Protection of hands:**
The glove material has to be impermeable and resistant to the product/ the substance/ the preparation.
Selection of the glove material on consideration of the penetration times, rates of diffusion and the degradation
· **Material of gloves**
The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer.
· **Penetration time of glove material**
The exact break trough time has to be found out by the manufacturer of the protective gloves and has to be observed.
· **Eye protection:**
Safety glasses
Goggles recommended during refilling

(Contd. on page 3)

(Contd. of page 2)

· **Body protection:** Oil resistant protective clothing

9 Physical and chemical properties

· **General Information**	
Form:	Liquid
Colour:	Brown
Odour:	Mineral-oil-like
· **Change in condition**	
Melting point/Melting range:	Undetermined.
Boiling point/Boiling range:	Undetermined.
· **Flash point:**	> 100°C
· **Ignition temperature:**	>250°C
· **Danger of explosion:**	Product does not present an explosion hazard.
· **Density at 20°C:**	0.88 g/cm³
· **Solubility in / Miscibility with water:**	Not miscible or difficult to mix.
· **Viscosity:**	
Kinematic at 40°C:	37 cSt

10 Stability and reactivity

· **Thermal decomposition / conditions to be avoided:**
No decomposition if used and stored according to specifications.
· **Dangerous reactions** No dangerous reactions known.
· **Dangerous decomposition products:** Carbon monoxide and carbon dioxide

11 Toxicological information

· **Acute toxicity:**
· **Primary irritant effect:**
· **on the skin:** No irritant effect.
· **on the eye:** No irritating effect.
· **Sensitization:** No sensitizing effects known.
· **Additional toxicological information:**
When used and handled according to specifications, the product does not have any harmful effects to our experience and the information provided to us.
The substance is not subject to classification according to the latest version of the EU lists.

12 Ecological information

· **Behaviour in environmental systems:**
· **Mobility and bioaccumulation potential:** Product is not expected to bioaccumulate.
· **General notes:** Generally not hazardous for water

13 Disposal considerations

· **Product:**
· **Recommendation**
Contact waste processors for recycling information.

(Contd. on page 4)

(Contd. of page 3)

Must not be disposed together with household garbage. Do not allow product to reach sewage system.
Delivery of waste oil to offically authorized collectors only.
Used, degraded or contaminated product may be classified as hazardous waste. Anyone classifying hazardous waste and determining its fate must be qualified in accordance with state and international legislation.

· **European waste catalogue**
Waste key numbers in accordance with the European Waste catalogue (EWC) are origin-referred defined. Since this product is used in several industries, no waste key can be provided by the supplier. The waste key number should be determined in arrangement with your waste disposal partner or the responsible authority.

· **Uncleaned packaging:**
· **Recommendation:** Disposal must be made according to official regulations.

14 Transport information

· **Land transport ADR/RID (cross-border)**
· **ADR/RID class:** -

· **Maritime transport IMDG:**
· **IMDG Class:** -
· **Marine pollutant:** No

· **Air transport ICAO-TI and IATA-DGR:**
· **ICAO/IATA Class:** -

15 Regulatory information

· **Labelling according to EU guidelines:**
Observe the general safety regulations when handling chemicals.
The substance is not subject to classification according to EU lists and other sources of literature known to us.

· **Special labelling of certain preparations:**
Safety data sheet available for professional user on request.

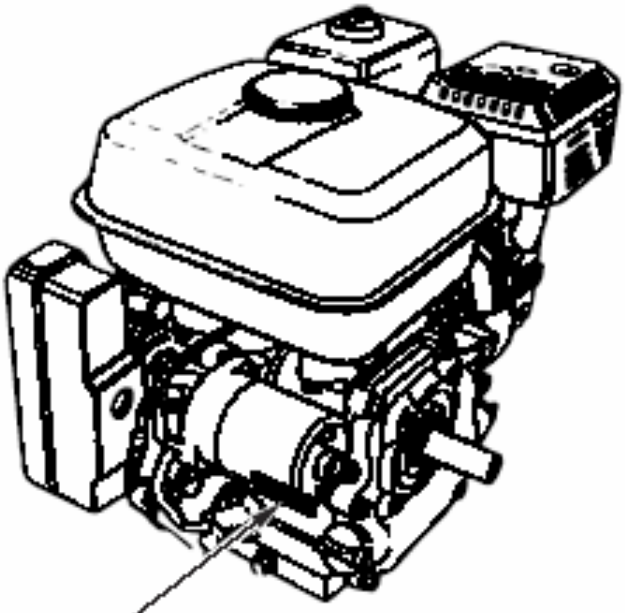
16 Other information

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

· **Department issuing MSDS:** Product safety department.
· **Contact:** GORDON SHARP

HONDA

GX120 · GX160 · GX200



OWNER'S MANUAL

CE

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HONDA EUROPE N.V.(EEC)
www.honda-engines-eu.com

Thank you for purchasing a Honda engine.

This manual covers the operation and maintenance of your engine:
GX120 · GX160 · GX200

All information in this publication is based on the latest product information available at the time of printing.

Honda Motor Co., Ltd. reserves the right to make changes at any time without notice and without incurring any obligation.

This manual should be considered a permanent part of the engine and should remain with it if it is resold.

Pay special attention to statements preceded by the following words:

⚠WARNING **Indicates a strong possibility of severe personal injury or death if instructions are not followed.**

CAUTION: Indicates a possibility of personal injury or equipment damage if instructions are not followed.

NOTICE **Indicates that equipment or property damage can result if instructions are not followed.**

NOTE: Gives helpful information.

If a problem should arise, or if you have any questions about your engine, consult an authorized Honda dealer.

⚠WARNING

The Honda engine is designed to give safe and dependable service if operated according to instructions. Read and understand the Owner's Manual before operating the engine. Failure to do so could result in personal injury or equipment damage.

1 SAFETY INSTRUCTIONS

⚠WARNING

To ensure safe operation—

- **Honda engine is designed to give safe and dependable service if operated according to instructions. Read and understand the Owner's Manual before operating the engine. Failure to do so could result in personal injury or equipment damage.**

- **Always make a pre-operation inspection (page 6) before you start the engine. You may prevent an accident or equipment damage.**
- **To prevent fire hazards and to provide adequate ventilation, keep the engine at least 1 meter (3 feet) away from buildings and other equipment during operation. Do not place flammable objects close to the engine.**
- **Children and pets must be kept away from the area of operation due to a possibility of burns from hot engine components or injury from any equipment the engine may be used to operate.**
- **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 place flammable objects such as gasoline, matches, etc., close to the engine while it is running.**
- **Refuel in a well-ventilated area with the engine stopped. Gasoline is highly flammable and explosive under certain conditions.**
- **Do not overfill the fuel tank. There should be no fuel in the filler neck.**
  Make sure that the filler cap is closed securely.
- **If any fuel is spilled, clean it up completely and allow petroleum vapours to dissipate before starting the engine.**
- **Do not smoke or allow flames or sparks where the engine is refueled or where gasoline is stored.**
- **Exhaust gas contains poisonous carbon monoxide. Avoid inhalation of exhaust gases. Never run the engine in a closed garage or confined area.**
- **Place the engine on a stable surface. Do not tilt the engine more than 20° from horizontal. Operating at excessive angles may result in fuel spillage.**

SAFETY INSTRUCTIONS

⚠WARNING

To ensure safe operation—

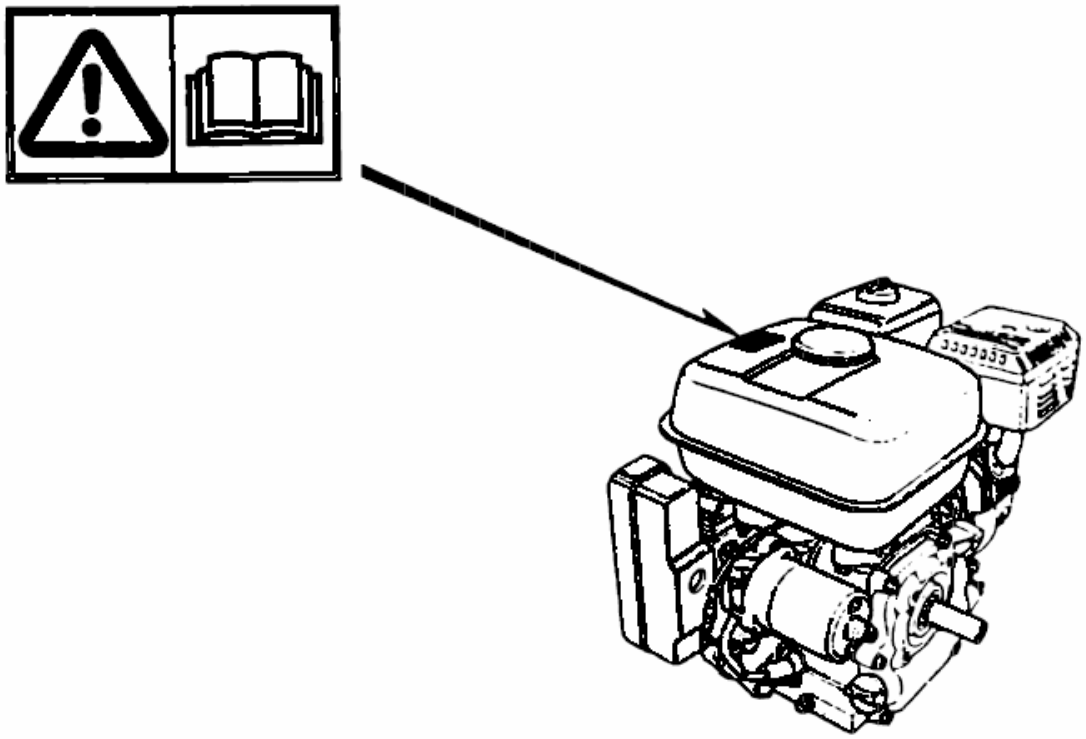
- **Do not place anything on the engine, as it may create a fire hazard.**
- **A spark arrester is available as an optional part for this engine. It is illegal in some areas to operate an engine without a spark arrester. Check local laws and regulations before operating.**
- **The muffler becomes very hot during operation and remains hot for a while after stopping the engine. Be careful not to touch the muffler while it is hot. To avoid severe burns or fire hazards, let the engine cool before transporting it or storing it indoors.**

SAFETY LABEL LOCATION

This label warns you of potential hazards that can cause serious injury. Read it carefully.

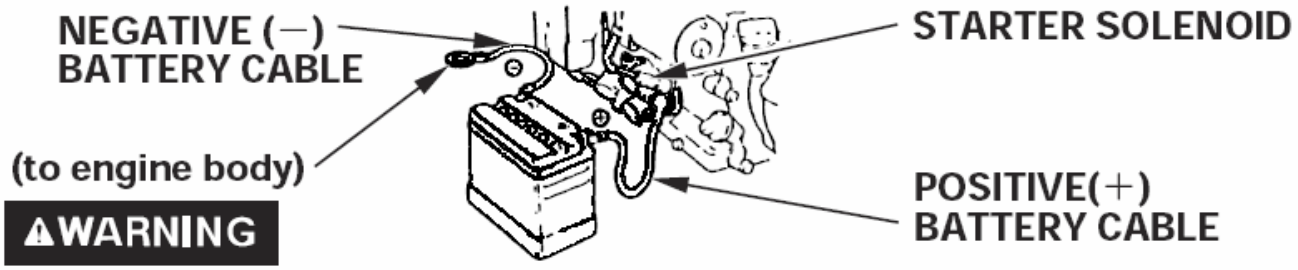
If the label comes off or becomes hard to read, contact your Honda dealer for replacement.

READ OWNER'S MANUAL



2 BATTERY CONNECTIONS (for electric starter)

Use a 12 volt battery with an ampere-hour rating of at least 18 AH.
Connect the battery positive (+) cable to the starter solenoid terminal, as shown.
Connect the battery negative (−) cable to an engine mounting bolt, frame bolt, or other good engine ground connection.
Check the battery cable connections to be sure the cables are tightened and free of corrosion. Remove any corrosion, and coat the terminals and cable ends with grease.



⚠WARNING

- **The battery gives off explosive gases; keep sparks, flames and cigarettes away. Provide adequate ventilation when charging or using batteries in an enclosed space.**
- **The battery contains sulfuric acid (electrolyte). Contact with skin or eyes may cause severe burns. Wear protective clothing and a face shield.**
  - **—If electrolyte gets on your skin, flush with water.**
  - **—If electrolyte gets in your eyes, flush with water for at least 15 minutes and call a physician immediately.**
- **Electrolyte is poisonous.**
  - **—If swallowed, drink large quantities of water or milk and follow with milk of magnesia or vegetable oil and call a physician immediately.**
- **KEEP OUT OF REACH OF CHILDREN.**

NOTICE

- **Use only distilled water in the battery. Tap water will shorten the service life of the battery.**
- **Filling the battery above the UPPER LEVEL line may cause the electrolyte to overflow, resulting in corrosion to engine or nearby parts. Immediately wash off any spilled electrolyte.**
- **Be careful not to connect the battery in reverse polarity, as this will short circuit the battery charging system and trip the circuit breaker.**

3 PRE-OPERATION CHECK

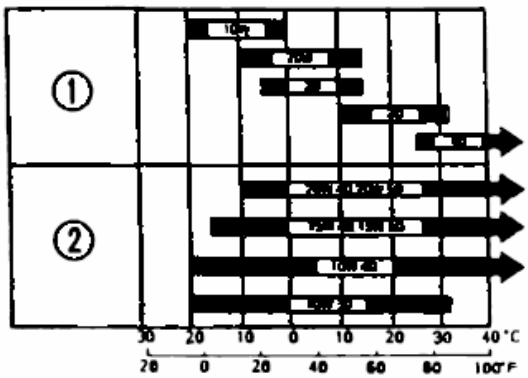
1. Engine oil level

CAUTION:

- **Running the engine with insufficient oil can cause serious engine damage.**
- **Be sure to check the engine on a level surface with the engine stopped.**

1. Remove the oil filler cap and wipe the dipstick clean.
2. Insert the dipstick into the oil filler neck, but do not screw it in.
3. If the level is low, fill to the top of the oil filler neck with the recommended oil.

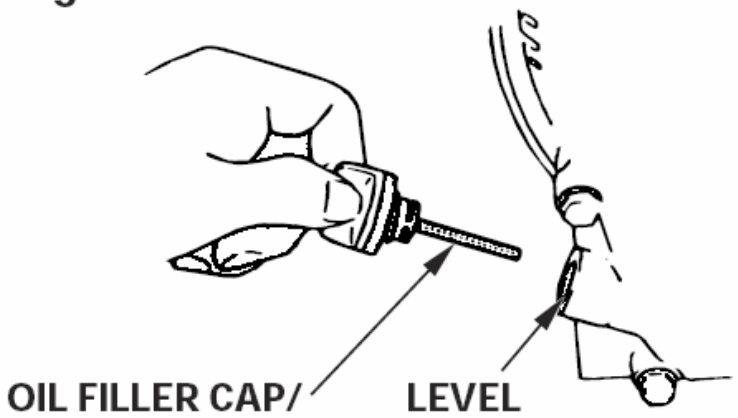
Use Honda 4-stroke, or an equivalent high detergent, premium quality motor oil certified to meet or exceed U.S. automobile manufacturer's requirements for service classification SG, SF. Motor oils classified SG, SF will show this designation on the container.
SAE 10W-30 is recommended for general, all temperature use. If single viscosity oil is used, select the appropriate viscosity for the average temperature in your area.

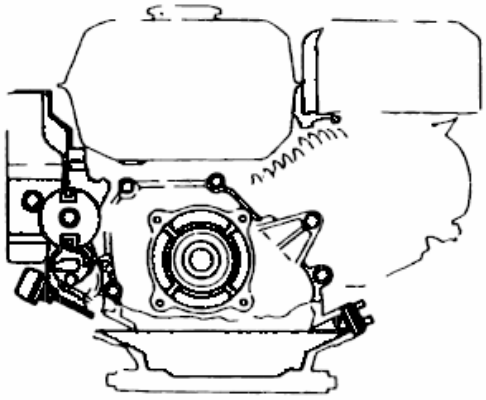


Ambient temperature

① SINGLE VISCOSITY
② MULTI VISCOSITY

CAUTION:
Using nondetergent oil or 2-stroke engine oil could shorten the engine's service life.





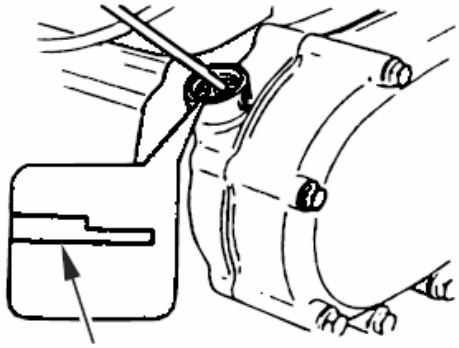
2. Reduction gear oil

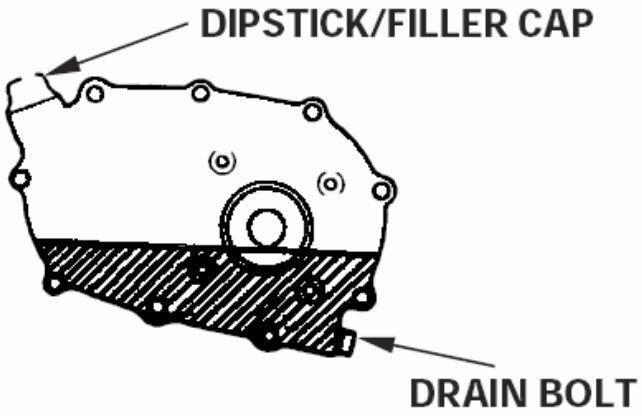
Check reduction gear oil level.
Fill with SG, SF rated engine oil, if necessary.

〈1/2 reduction with automatic centrifugal clutch〉

1. Remove the oil filler cap and wipe the dipstick clean.
2. Insert the dipstick into the filler neck but do not screw it in.
3. If the level is low, fill to the upper level mark with the same oil recommended for the engine (see engine oil recommendations on page 6).

Oil capacity: 0.50 ℓ (0.53 US qt , 0.44 Imp qt)

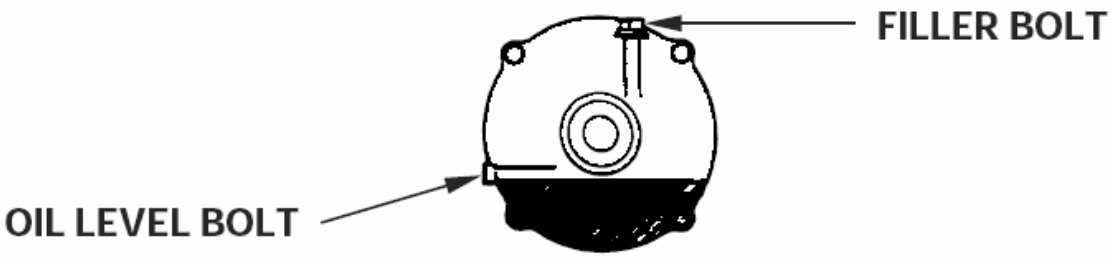




〈1/6 reduction〉

1. Remove the oil level bolt.
2. Check the oil level; it should reach the edge of the oil level bolt hole. If the oil level is low, remove the filler bolt, and add oil until it starts to flow out the oil level bolt hole. Use the same oil recommended for the engine (see engine oil recommendations on page 6).
3. Install the oil level bolt and filler bolt. Tighten them securely.

Oil capacity: 0.15 ℓ (0.16 US qt , 0.13 Imp qt)



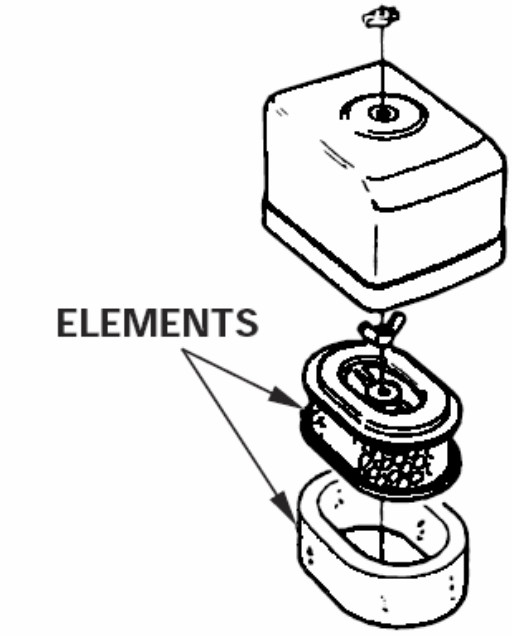
3. Air cleaner

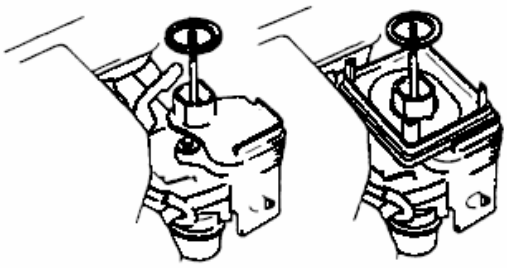
CAUTION:

Never run the engine without the air cleaner. Rapid engine wear will result.

〈**Dual element type**〉

1. Check the air cleaner elements to be sure they are clean and in good condition.
2. Clean or replace the elements if necessary (page 21).

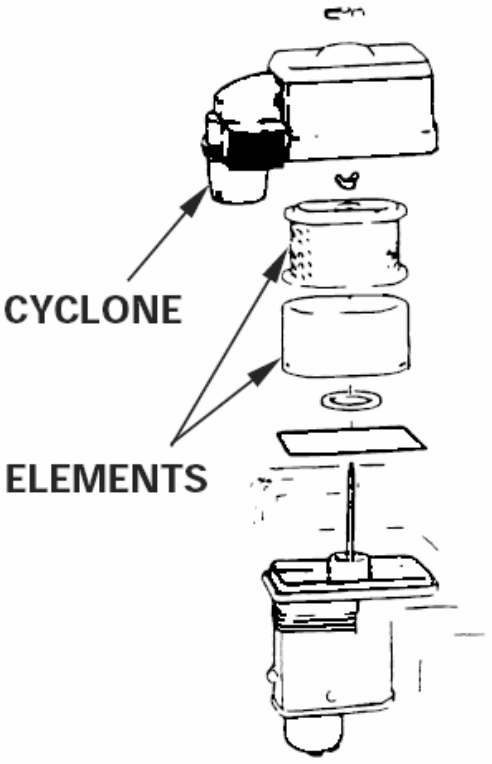




(GX120/160) (GX120/160/200)

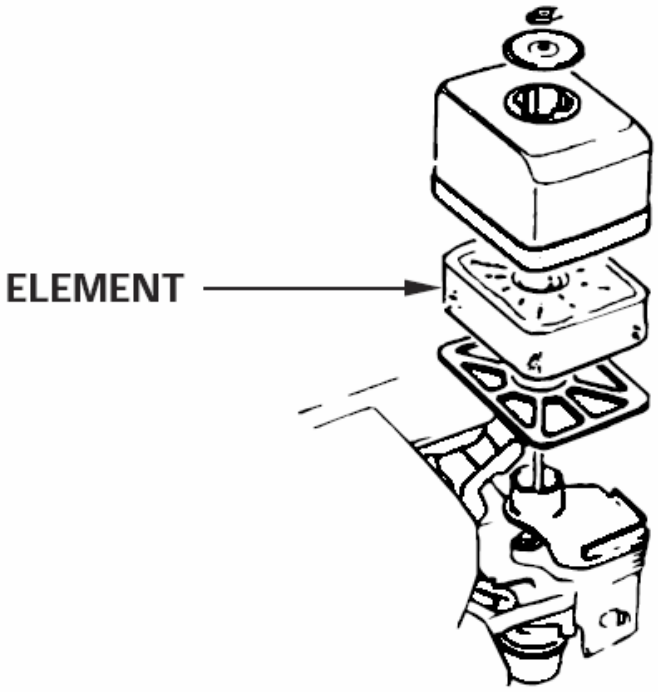
〈**Cyclone type**〉

1. Check cleaner for dirt or obstruction of elements.
2. Check the cyclone housing for any dirt build-up, clean it, if necessary (page 22).



〈**Semi-dry type**〉

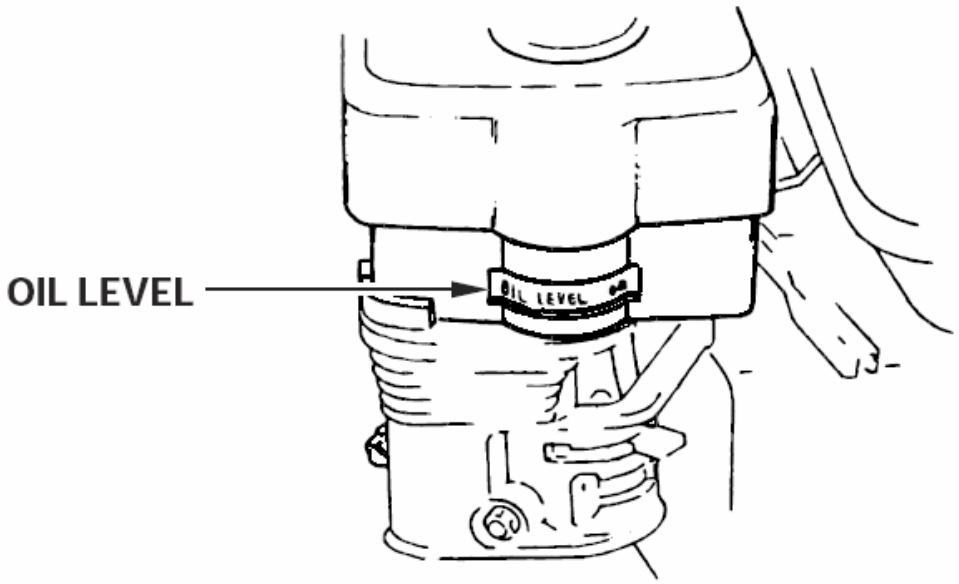
Check cleaner for dirt or obstruction of element (page 23).



〈**Oil bath type**〉

1. Check the air cleaner element to be sure it is clean and in good condition. Clean or replace the element if necessary (page 23).
2. Check oil level and condition.

CAUTION:
Never run the engine without the air cleaner. Rapid engine wear will result.



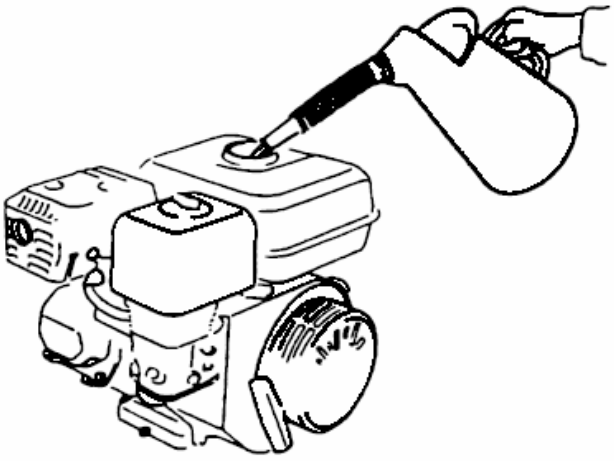
4. Fuel

Use automotive gasoline (Unleaded or lowleaded is preferred to minimize combustion chamber deposits).
FOR NEW SOUTH WALES ONLY:
Use unleaded fuel only.
Never use an oil/gasoline mixture or dirty gasoline. Avoid getting dirt, dust or water in the fuel tank.

⚠WARNING

- **Gasoline is extremely flammable and is explosive under certain conditions.**
- **Refuel in a well-ventilated area with the engine stopped. Do not smoke or allow flames or sparks in the area where the engine is refueled or where gasoline is stored.**
- **Do not overfill the fuel tank (there should be no fuel in the filler neck). After refueling, make sure the tank cap is closed properly and securely.**
- **Be careful not to spill fuel when refueling. Spilled fuel or fuel vapor may ignite. If any fuel is spilled, make sure the area is dry before starting the engine.**
- **Avoid repeated or prolonged contact with skin or breathing of vapor.**
  KEEP OUT OF REACH OF CHILDREN.

Fuel tank capacity:	GX120..	2.5 ℓ (0.66 US gal , 0.55 Imp gal)
	GX160..	3.6 ℓ (0.95 US gal , 0.79 Imp gal)
	GX200..	3.6 ℓ (0.95 US gal , 0.79 Imp gal)



GASOLINES CONTAINING ALCOHOL

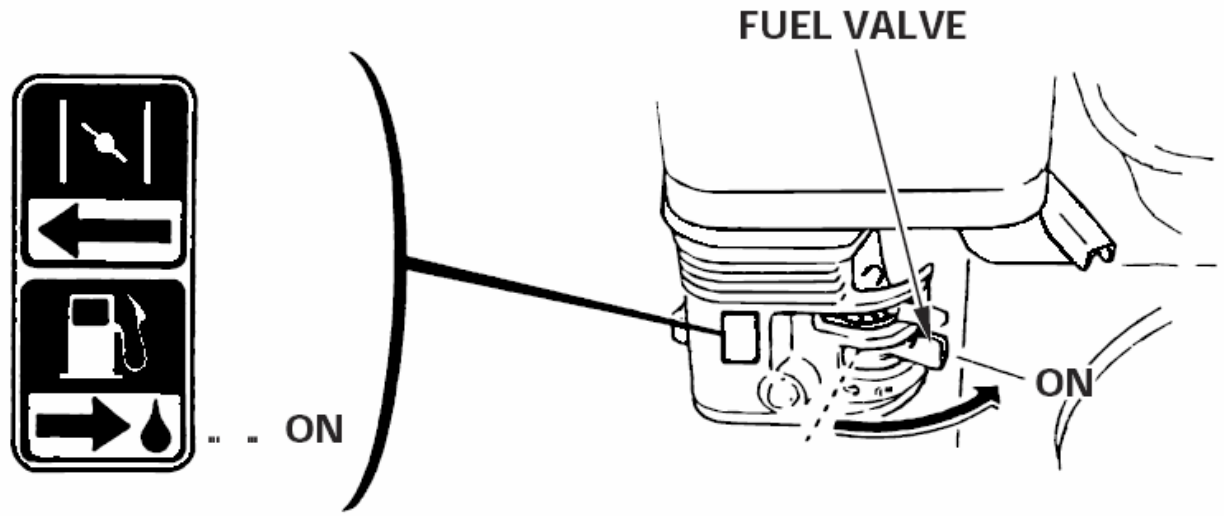
If you decide to use a gasoline containing alcohol (gasohol), be sure it's octane rating is at least as high as that recommended by Honda. There are two types of "gasohol": one containing ethanol, and the other containing methanol. Do not use gasohol that contains more than 10% ethanol. Do not use gasoline containing methanol (methyl or wood alcohol) that does not also contain cosolvents and corrosion inhibitors for methanol. Never use gasoline containing more than 5% methanol, even if it has cosolvents and corrosion inhibitors.

NOTE:

- Fuel system damage or engine performance problems resulting from the use of fuels that contain alcohol is not covered under the warranty. Honda cannot endorse the use of fuels containing methanol since evidence of their suitability is as yet incomplete.
- Before buying fuel from an unfamiliar station, try to find out if the fuel contains alcohol, if it does, confirm the type and percentage of alcohol used. If you notice any undesirable operating symptoms while using a gasoline that contains alcohol, or one that you think contains alcohol, switch to a gasoline that you know does not contain alcohol.

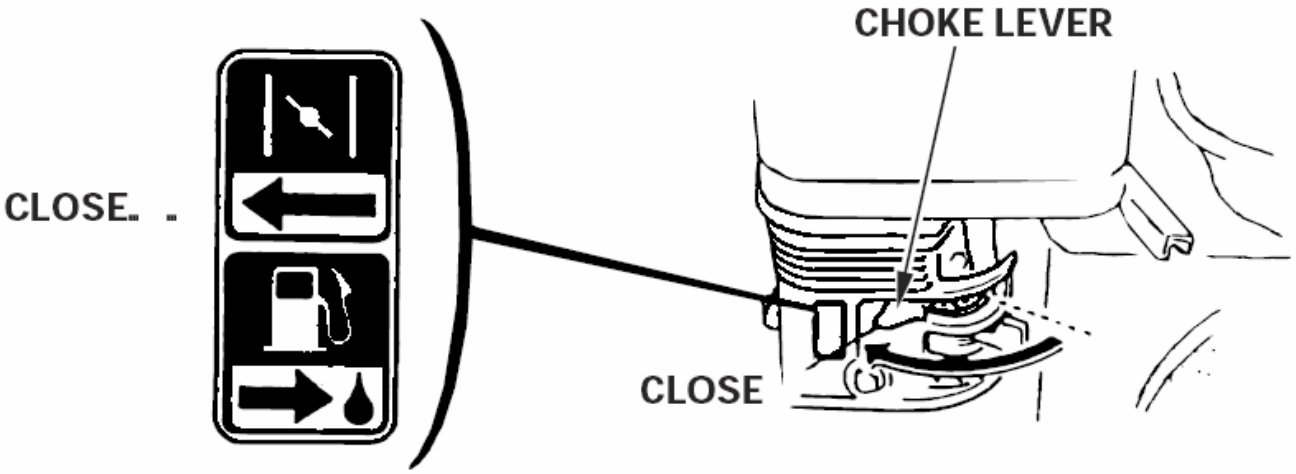
4 STARTING THE ENGINE

1. Turn the fuel valve to the ON position.

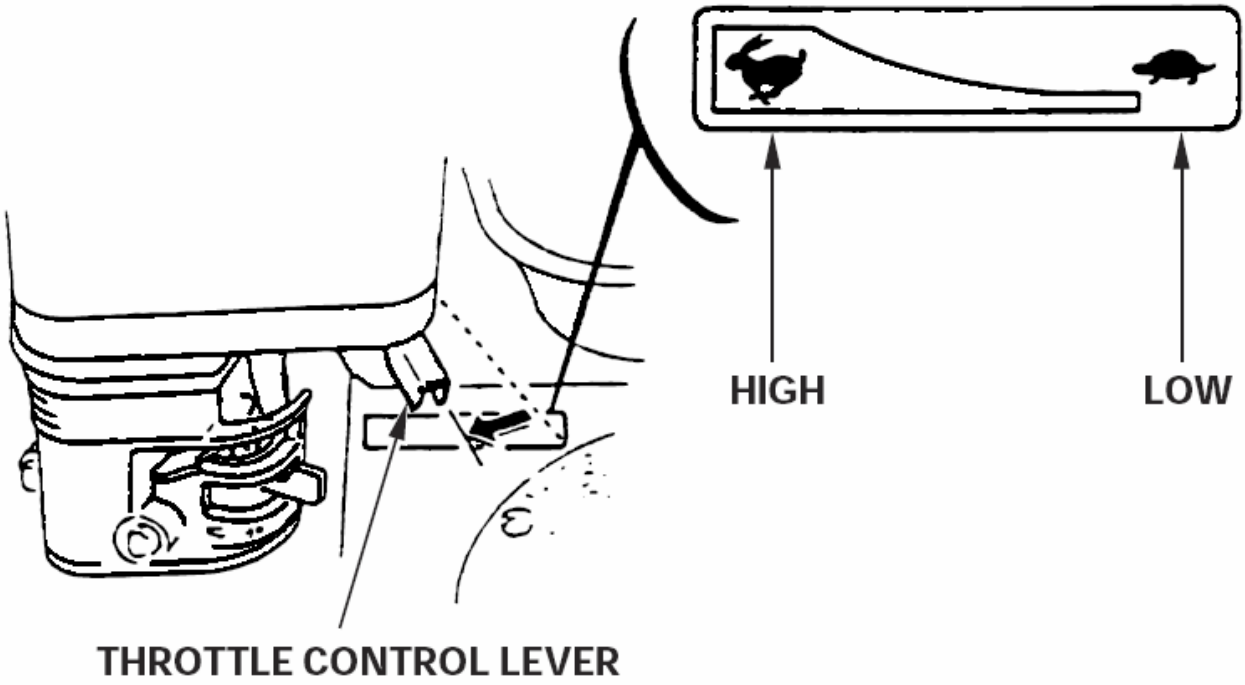


2. Move the choke lever to the CLOSED position.

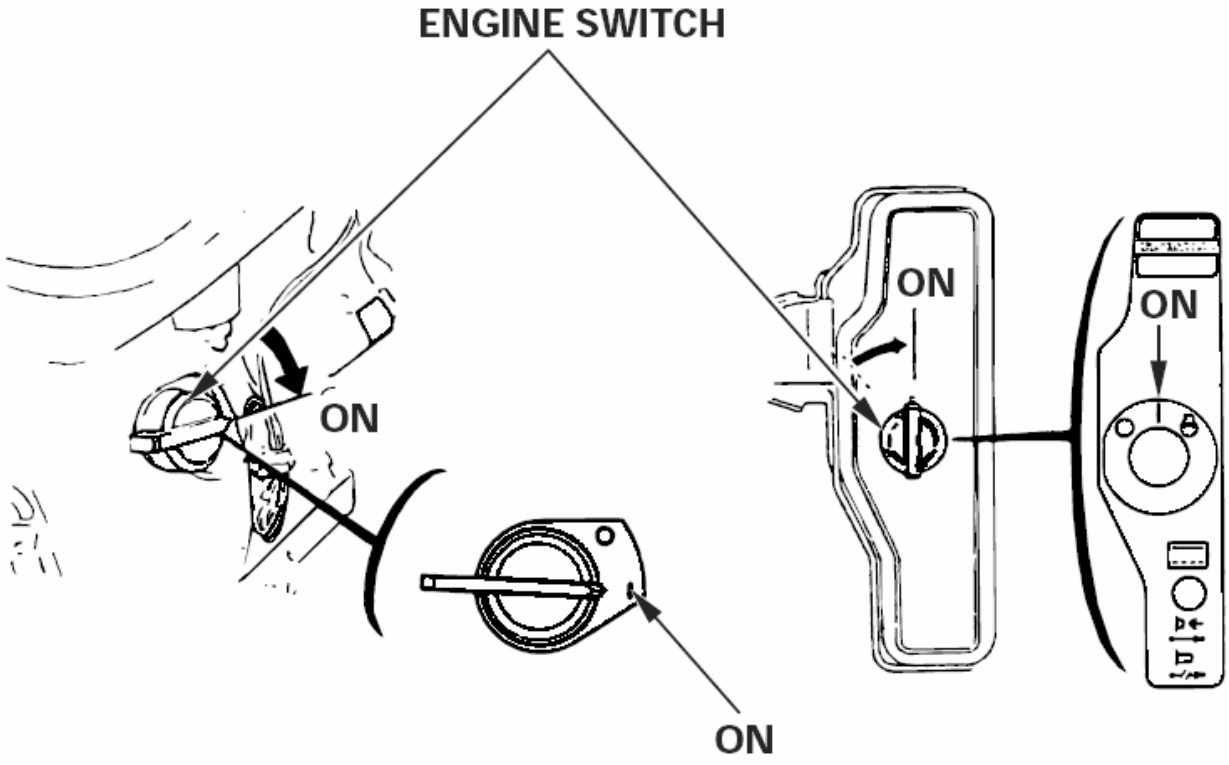
NOTE:
Do not use the choke if the engine is warm or the air temperature is high.



3. Move the throttle control lever slightly to the left.

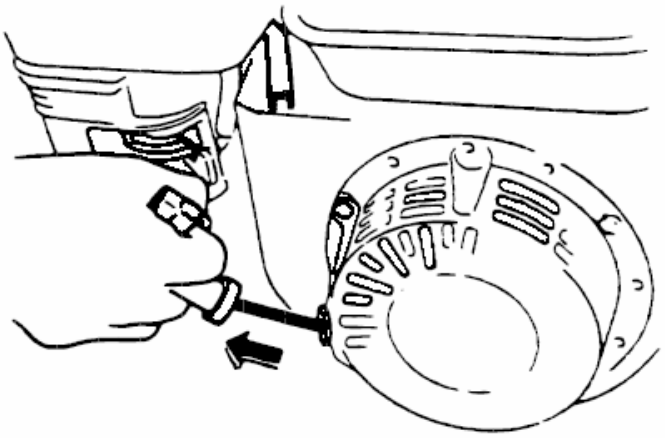


4. Start the engine.
- With recoil starter:
  Turn the engine switch to the ON position.



Pull the starter grip lightly until resistance is felt, then pull briskly.

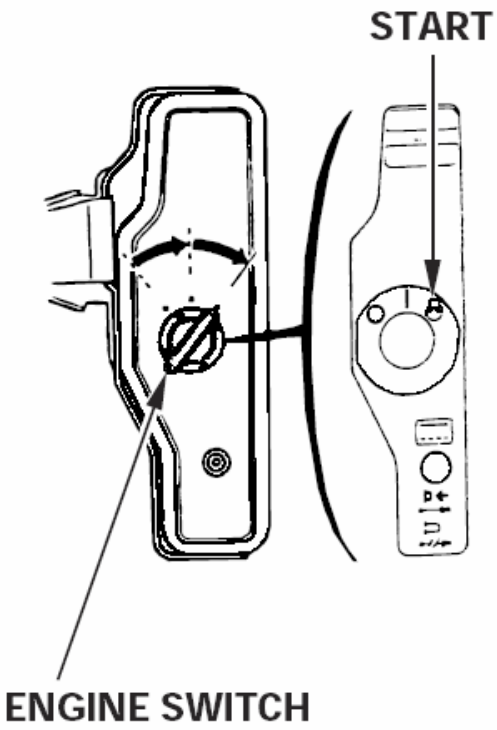
CAUTION:
Do not allow the starter grip to snap back against the engine. Return it gently to prevent damage to the starter.



- With electric starter (where equipped):
  Turn the engine switch to the START position and hold it there until the engine starts.

NOTE:
Do not use the electric starter for more than 5 seconds at a time. If the engine fails to start, release the key and wait 10 seconds before operating the starter again.

When the engine starts, return the switch to the ON position.



• **High altitude operation**

At high altitude, the standard carburetor air-fuel mixture will be excessively rich. Performance will decrease, and fuel consumption will increase.

High altitude performance can be improved by specific modifications to the carburetor. If you always operate the engine at altitudes higher than 1,830 m (6,000 feet) above sea level, have your authorized Honda dealer perform these carburetor modifications.

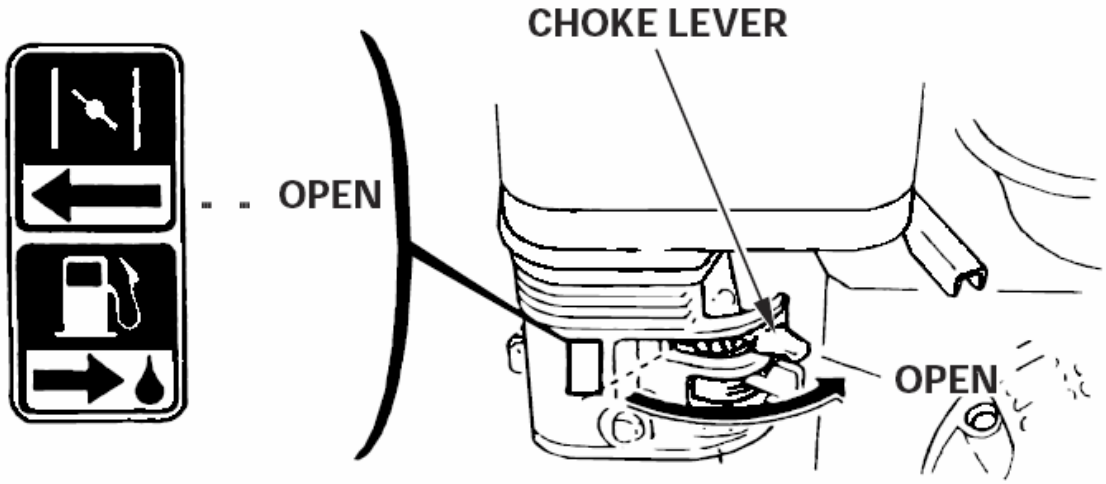
Even with suitable carburetor jetting, engine horsepower will decrease approximately 3.5% for each 305 m (1,000 feet) increase in altitude. The affect of altitude on horsepower will be greater than this if no carburetor modification is made.

CAUTION:

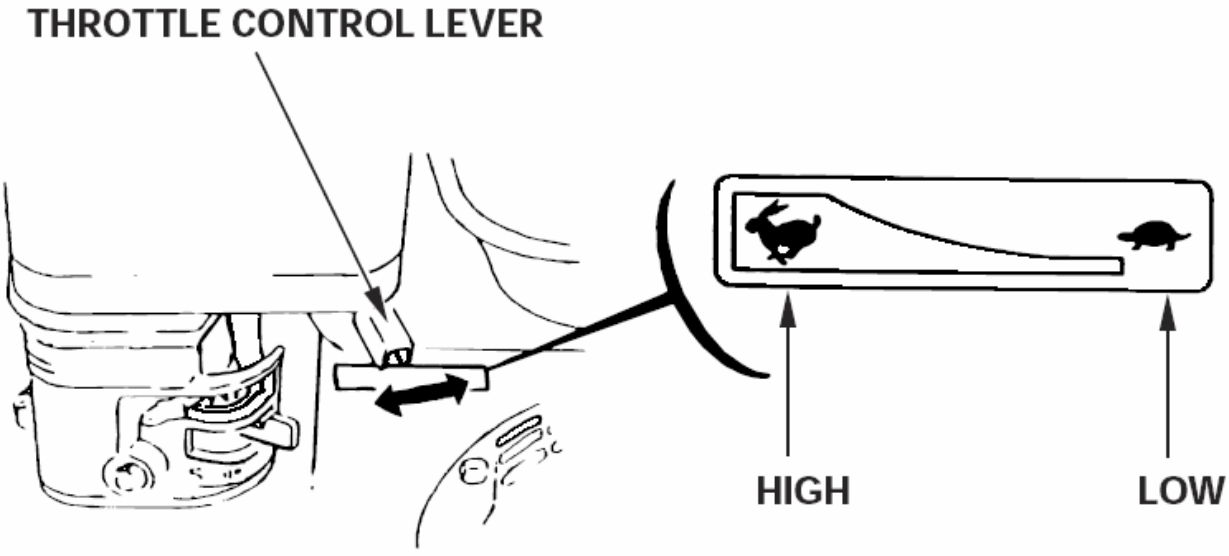
Operation of the engine at an altitude lower than the carburetor is jetted for may result in reduced performance, overheating, and serious engine damage caused by an excessively lean air/fuel mixture.

5 OPERATION

1. As the engine warms up, gradually move the choke lever to the OPEN position.



2. Position the throttle control lever for the desired engine speed.



Oil alert system (Where equipped)
The Oil Alert System is designed to prevent engine damage caused by an insufficient amount of oil in the crankcase. Before the oil level in the crankcase can fall below a safe limit, the Oil Alert System will automatically stop the engine (the engine switch will remain in the ON position).

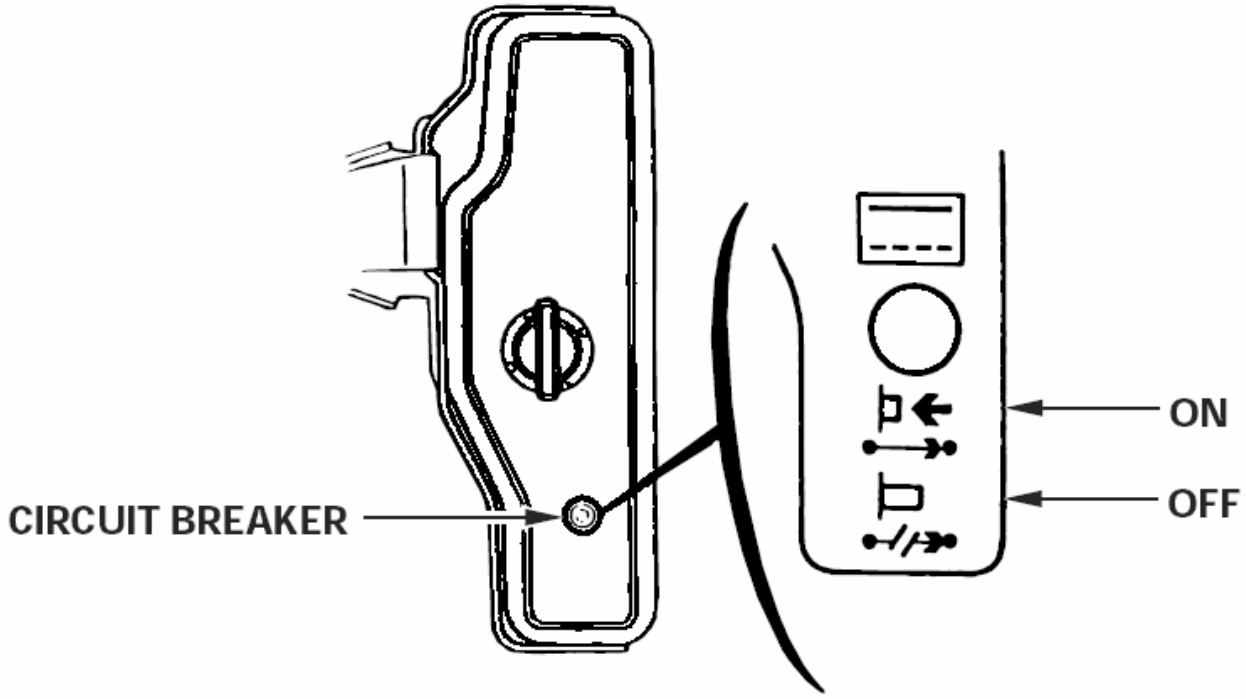
NOTICE

If the engine stops and will not restart, check the engine oil level (page 6) before troubleshooting in other areas.

Circuit breaker (for electric starter)
The circuit breaker protects the battery charging circuit. A short circuit or a battery connected in 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.



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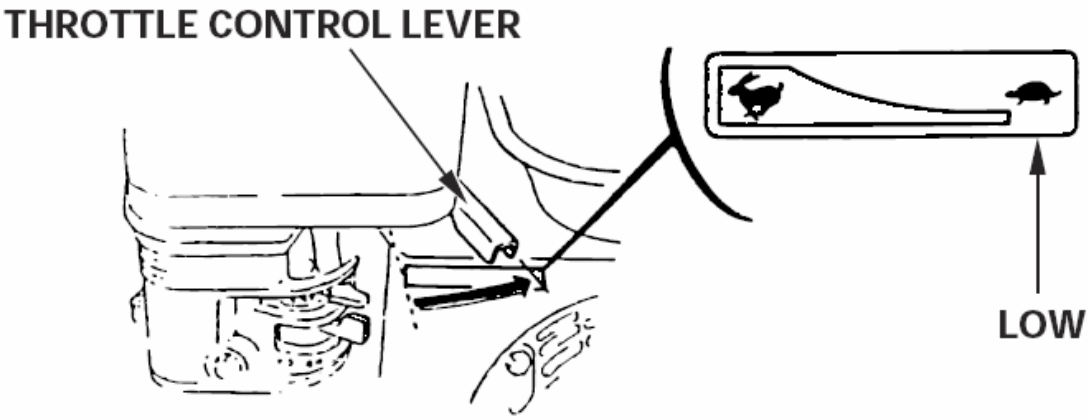
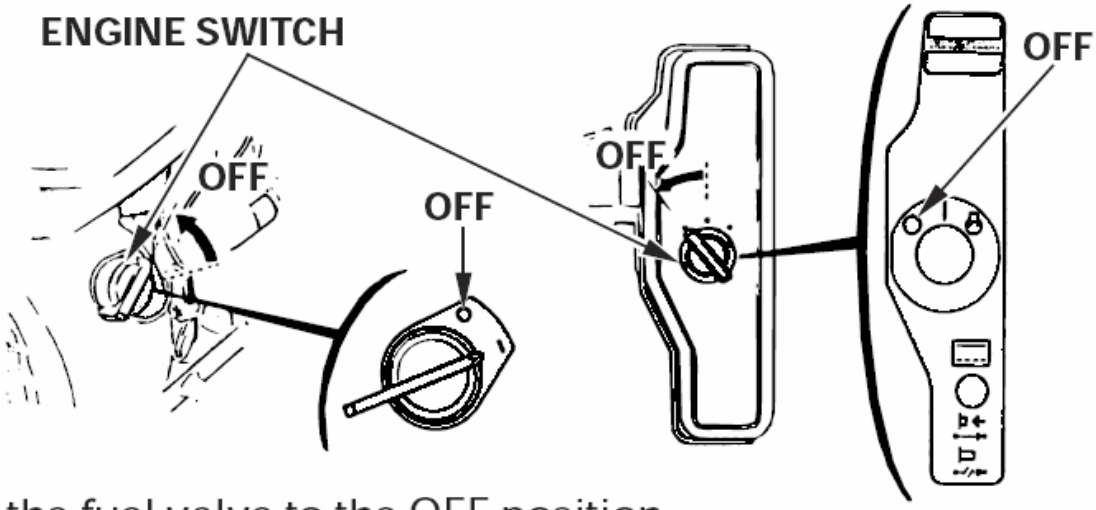
6 STOPPING THE ENGINE

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

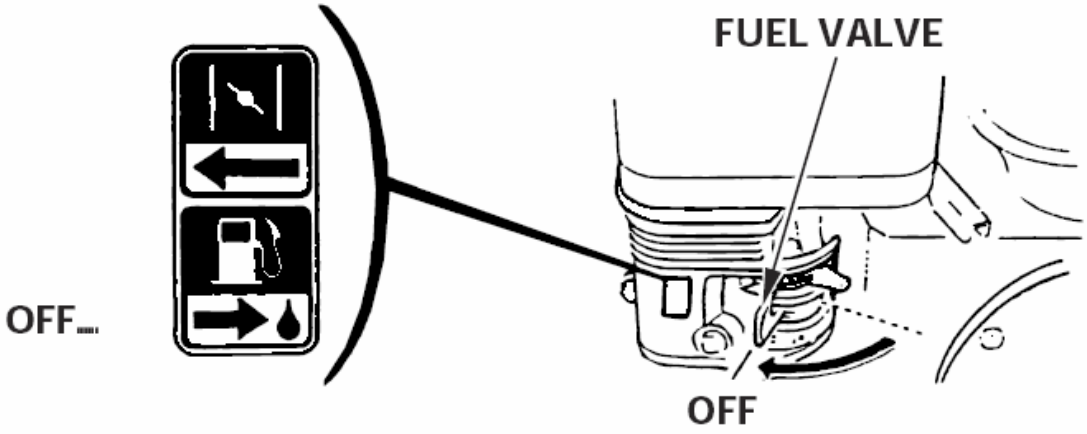
1. Move the throttle control lever fully to the right.



2. Turn the engine switch to the OFF position.



3. Turn the fuel valve to the OFF position.



7 MAINTENANCE

⚠WARNING

- **Shut off the engine before performing any maintenance.**
- **To prevent accidental start-up, turn OFF the engine switch key and disconnect the spark plug cap.**
- **The engine should be serviced by an authorized Honda dealer unless the owner has proper tools and service data and feels he is mechanically qualified.**

CAUTION:

Use only genuine Honda parts or their equivalent. The use of replacement parts which are not of equivalent quality may damage the engine.

Periodic inspection and adjustment of the Honda engine is essential if high level performance is to be maintained. Regular maintenance will also ensure a long service life. The required service intervals and the kind of maintenance to be performed are described on the table below.

Maintenance Schedule

REGULAR SERVICE PERIOD Performed at every indicated month or operating hour interval, whichever comes first. / ITEM		Each use	First month or 20 Hrs.	Every 3 month or 50 Hrs.	Every 6 month or 100 Hrs.	Every year or 300 Hrs.
Engine oil	Check level	○				
	Change		○		○	
Reduction gear oil	Check level	○				
(applicable models only)	Change		○			○
Air cleaner	Check	○				
	Clean			○ (1)		
Sediment cup	Clean				○	
Spark plug	Check—Clean				○	
Spark arrester (optional part)	Clean				○	
Valve clearance	Check—Adjust					○ (2)
Fuel tank and strainer	Clean					○ (2)
Fuel line	Check (Replace if necessary)	Every 2 years (2)				

NOTE: (1):Service more frequently when used in dusty areas.

(2):These items should be serviced by an authorized Honda dealer, unless the owner has the proper tools and is mechanically proficient. See the Honda Shop Manual.

1. Oil change

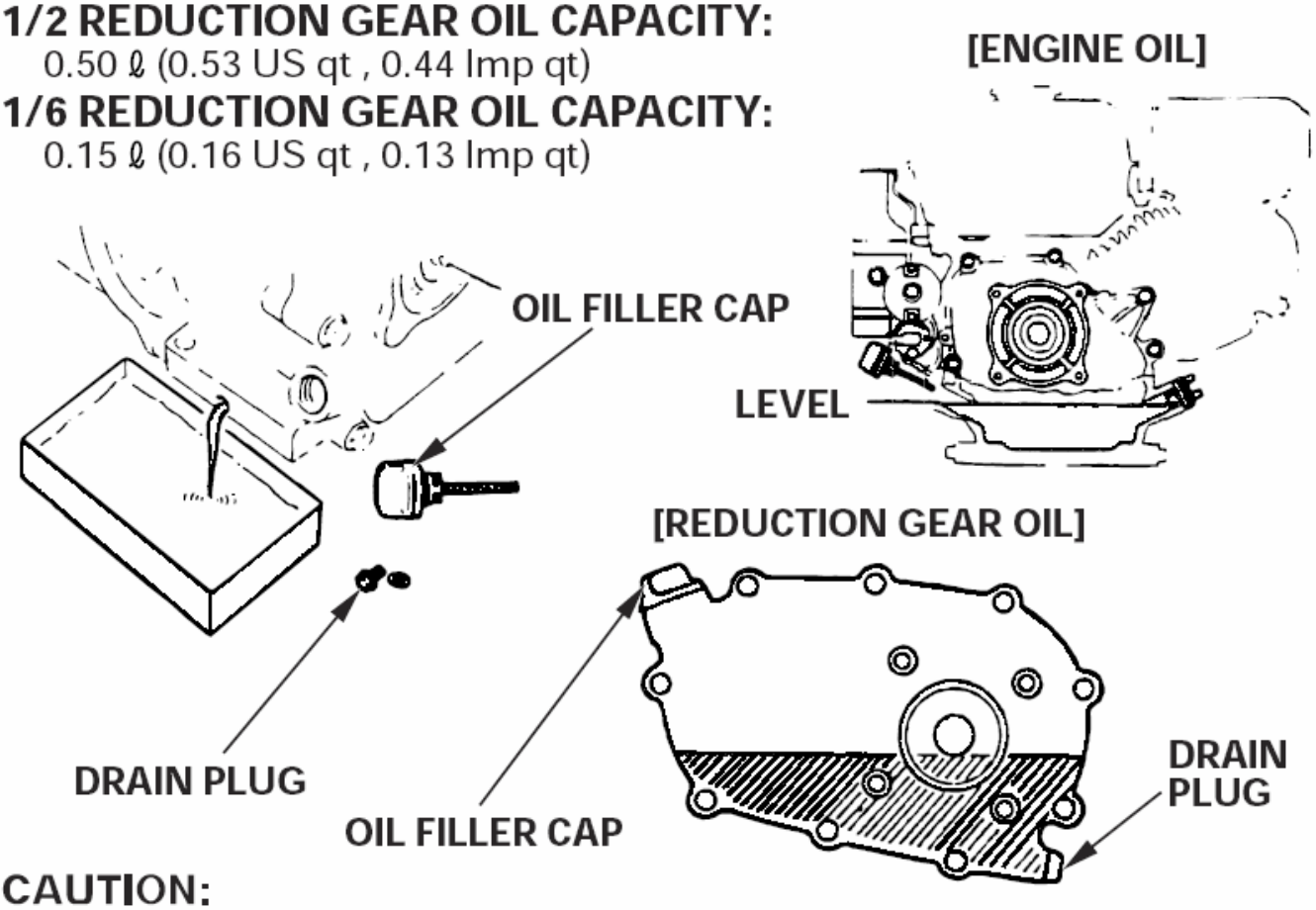
Drain the oil while the engine is still warm to assure rapid and complete draining.

1. Remove the oil filler cap and drain plug to drain the oil.
2. Install the drain plug, and tighten it securely.
3. Refill with the recommended oil (see page 6) and check the oil level.
4. Install the oil filler cap.

ENGINE OIL CAPACITY: 0.60 ℓ (0.63 US qt , 0.53 Imp qt)

1/2 REDUCTION GEAR OIL CAPACITY:
0.50 ℓ (0.53 US qt , 0.44 Imp qt)

1/6 REDUCTION GEAR OIL CAPACITY:
0.15 ℓ (0.16 US qt , 0.13 Imp qt)



CAUTION:

Used motor oil may cause skin cancer if repeatedly left in contact with the skin for prolonged periods. Although this is unlikely unless you handle used oil on a daily basis, it is still advisable to thoroughly wash your hands with soap and water as soon as possible after handling used oil.

NOTE:

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

2. Air cleaner service

A dirty air cleaner will restrict air flow to the carburetor. To prevent carburetor malfunction, service the air cleaner regularly. Service more frequently when operating the engine in extremely dusty areas.

⚠WARNING

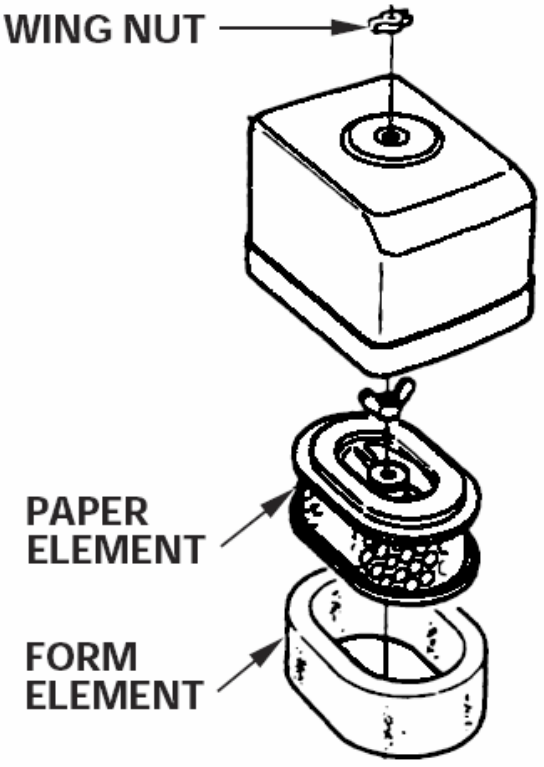
Never use gasoline or low flash point solvents for cleaning the air cleaner element. A fire or explosion could result.

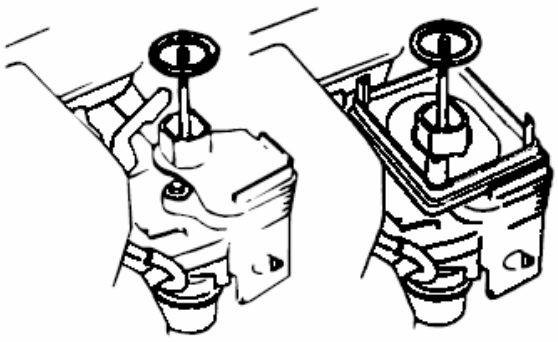
CAUTION:

Never run the engine without the air cleaner. Rapid engine wear will result.

〈Dual element type〉

1. Remove the wing nut and the air cleaner cover. Remove the elements and separate them. Carefully check both elements for holes or tears and replace if damaged.
2. Foam element: Wash the element in a solution of household detergent and warm water, then rinse thoroughly, or wash in nonflammable or high flash point solvent. Allow the element to dry thoroughly.
   Soak the element in clean engine oil and squeeze out the excess oil. The engine will smoke during initial start-up if too much oil is left in the foam.
3. Paper element: Tap the element lightly several times on a hard surface to remove excess dirt, or blow compressed air through the filter from the inside out. Never try to brush the dirt off; brushing will force dirt into the fibers. Replace the paper element if it is excessively dirty.

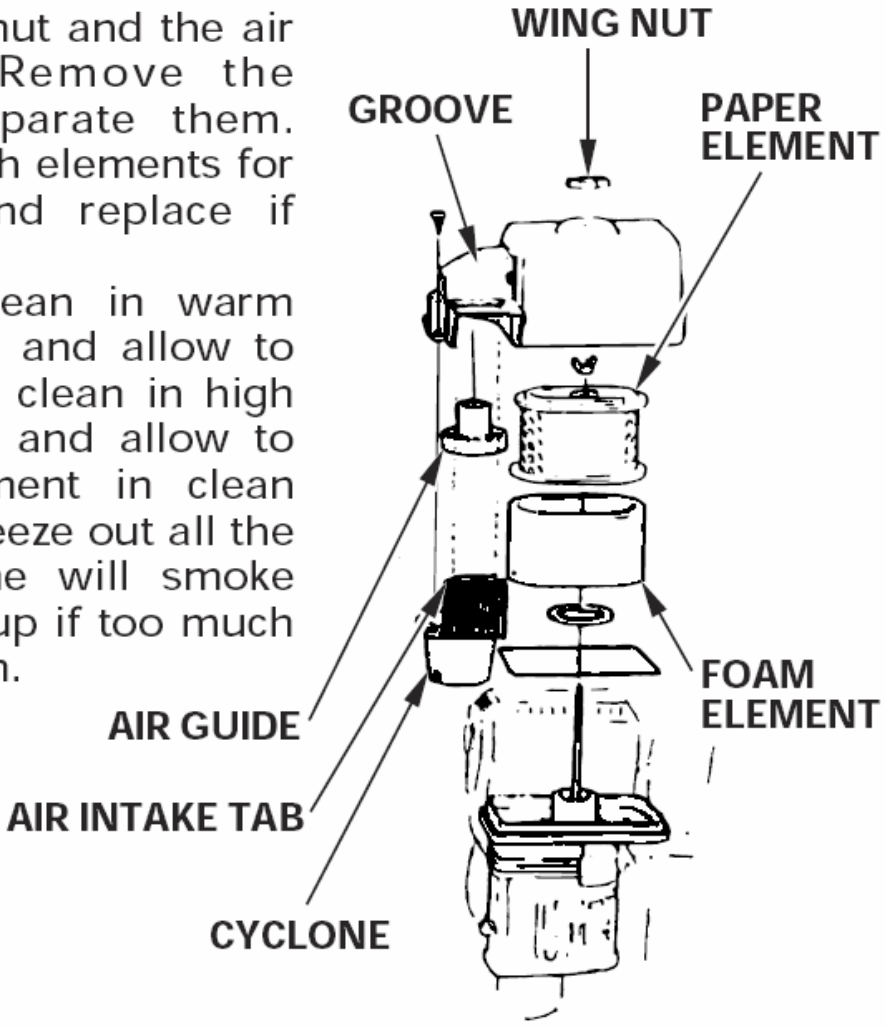




(GX120/160) (GX120/160/200)

〈**Cyclone type**〉

1. Remove the wing nut and the air cleaner cover. Remove the elements and separate them. Carefully check both elements for holes or tears and replace if damaged.
2. Foam element: Clean in warm soapy water, rince and allow to dry thoroughly. Or clean in high flash-point solvent and allow to dry. Dip the element in clean engine oil and squeeze out all the excess. The engine will smoke during initial start-up if too much oil is felt in the foam.



3. Paper element: Tap the element lightly several times on a hard surface to remove excess dirt, or blow compressed air through the filter from the inside out. Never try to brush the dirt off; brushing will force dirt into the fibers. Replace the paper element if it is excessively dirty.

(Cleaning the cyclone housing)

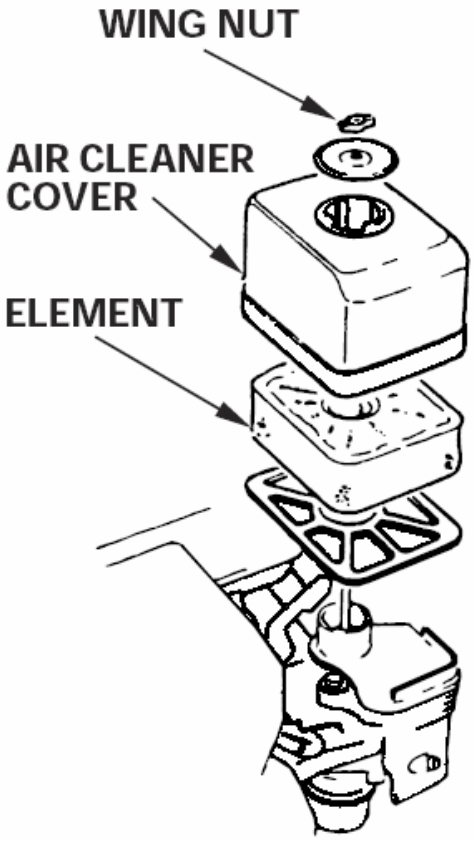
1. When the cyclone housing becomes dirty, unscrew the three special pan screws and wipe or wash the components with water. Next, thoroughly dry the components and carefully reassemble them.

CAUTION:

- **When reinstalling the cyclone, ensure that the tab on the air intake fits properly into the groove in the pre-cleaner cap.**
- **Be careful to install the air guide in the proper direction.**

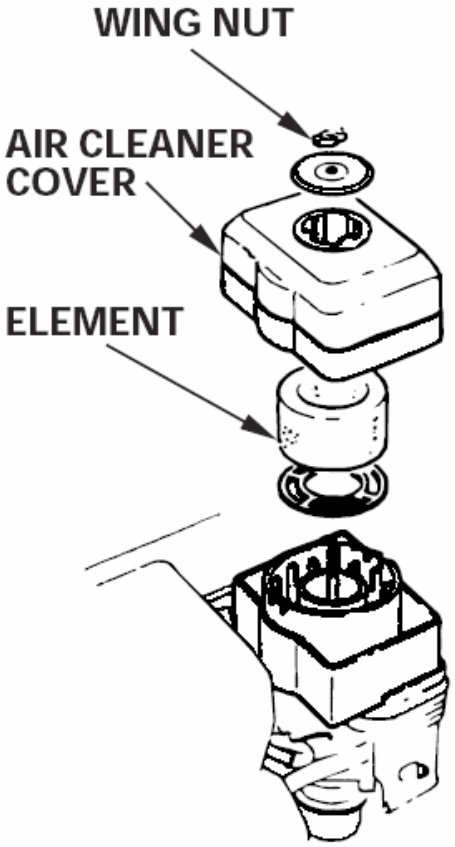
〈**Semi-dry type**〉

1. Unscrew the wing nut, remove the air cleaner cover and remove the element.
2. Wash the element in a nonflammable or high flash point solvent and dry it thoroughly.
3. Soak the element in clean engine oil and squeeze out the excess oil.
4. Reinstall the air cleaner element and the cover.



〈**Oil bath type**〉

1. Unscrew the wing nut, remove the air cleaner cover and remove the element.
2. Wash the element in a solution of household detergent and warm water, then rinse thoroughly, or wash in non-flammable or high flash point solvent. Allow the element to dry thoroughly.
3. Soak the element in clean engine oil and squeeze out the excess oil. The engine will smoke during intial start-up if too much oil is left in the element.
4. Empty the oil from the air cleaner case and wash out any accumulated dirt with nonflammable or high flash point solvent. Dry the case.
5. Fill the air cleaner case to the level mark with the same oil that is recommended for the engine (see engine oil recommendations on page 6).
6. Reinstall the element and the cover.

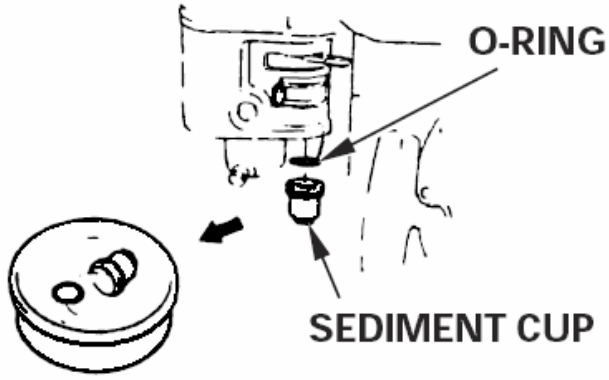


3. Sediment cup cleaning

⚠WARNING

- **Gasoline is extremely flammable and is explosive under certain conditions. Do not smoke or allow flames or sparks in the area.**
- **After installing the sediment cup, check for leaks, and make sure the area is dry before starting the engine.**

Turn the fuel valve to OFF. Remove the sediment cup and O-ring, and wash them in nonflammable or high flash point solvent. Dry them thoroughly and reinstall securely. Turn the fuel valve ON and check for leaks.



4. Spark plug service

Recommended spark plug: BPR6ES (NGK)
W20EPR-U (DENSO)

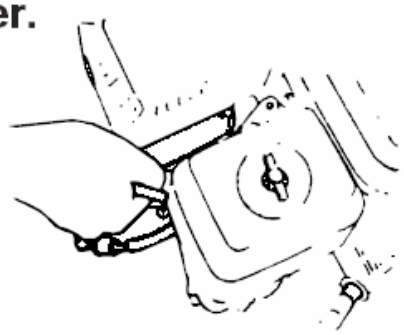
CAUTION:
Never use a spark plug of incorrect heat range.

To ensure proper engine operation, the spark plug must be properly gapped and free of deposits.

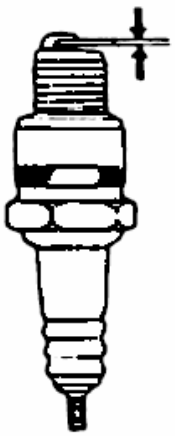
1. Remove the spark plug cap and use the proper size spark plug wrench to remove the spark plug.

⚠WARNING

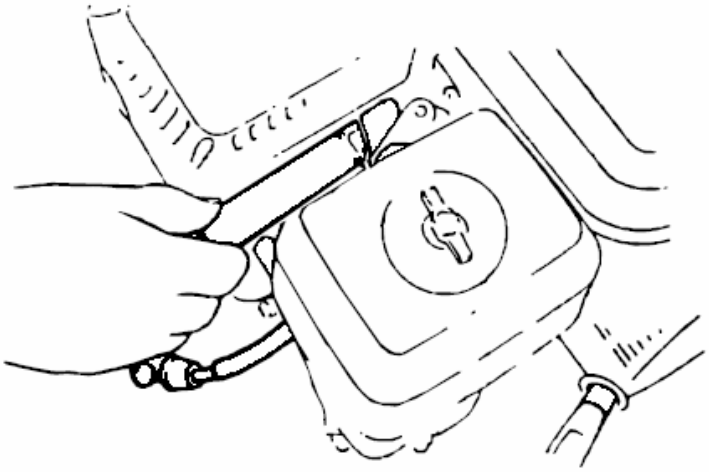
If the engine has been running, the muffler will be very hot. Be careful not to touch the muffler.



2. Visually inspect the spark plug. Discard the spark plug if there is apparent wear, or if the insulator is cracked or chipped. Clean the spark plug with a wire brush if it is to be reused.
3. Measure the plug gap with a feeler gauge. Correct as necessary by bending the side electrode.
   The gap should be:
   0.70—0.80 mm (0.028—0.031 in)



4. Check that each spark plug washer is in good condition, and thread the spark plug in by hand to prevent cross-threading.
5. After the spark plug is seated, tighten with a spark plug wrench to compress the washer.



NOTE:
When installing a new spark plug, tighten 1/2 turn after the spark plug seats to compress the washer. When reinstalling a used spark plug, tighten 1/8—1/4 turn after the spark plug seats to compress the washer.

CAUTION:
The spark plug must be securely tightened. An improperly tightened spark plug can become very hot and may damage the engine.

5. Spark arrester maintenance (optional part)

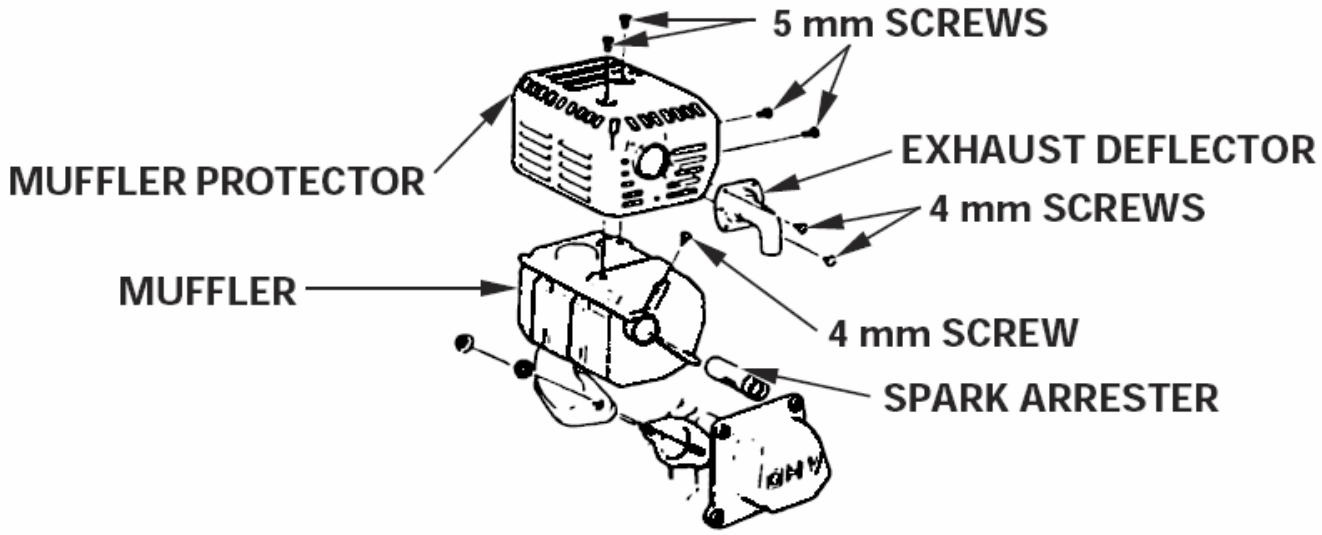
⚠WARNING

If the engine has been running, the muffler will be very hot. Allow it to cool before proceeding.

CAUTION:

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

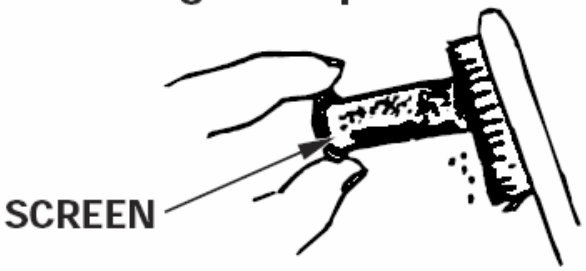
1. Remove the two 4 mm screws from the exhaust deflector, and remove the deflector.
2. Remove the four 5 mm screws from the muffler protector, and remove the muffler protector.
3. Remove the two 4 mm screw from the spark arrester, and remove the spark arrester from the muffler.



4. Use a brush to remove carbon deposits from the spark arrester screen.

CAUTION:

Be careful not to damage the spark arrester screen.



NOTE:

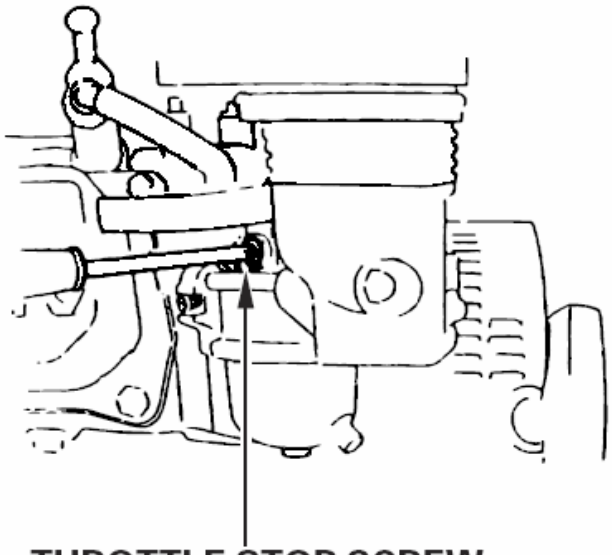
The spark arrester must be free of breaks and holes. Replace, if necessary.

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

6. Carburetor idle speed adjustment

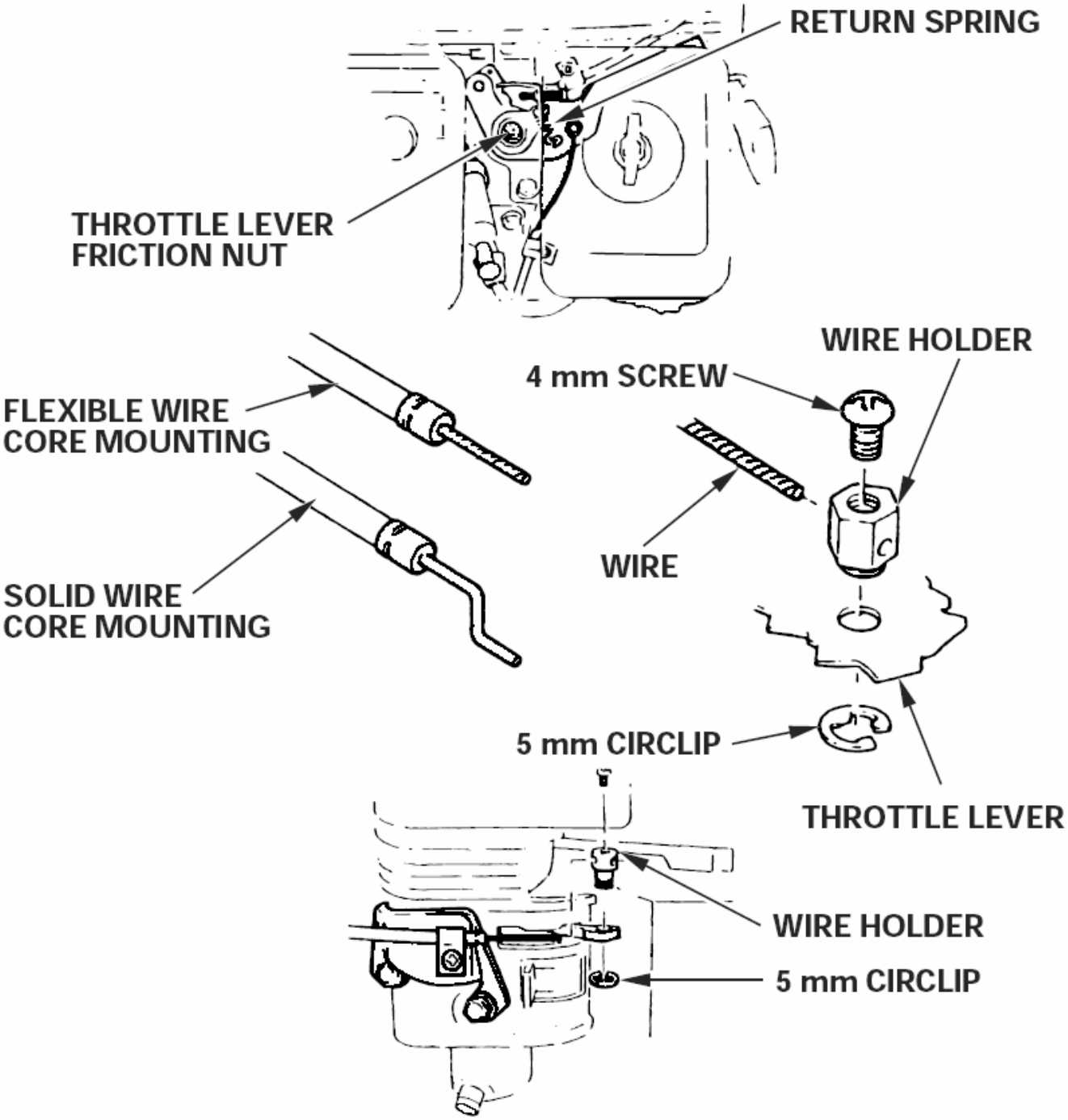
1. Start the engine and allow it to warm up to normal operating temperature.
2. With the engine idling, turn the throttle stop screw to obtain the standard idle speed.

Standard idle speed: $1{,}400 \pm \begin{matrix}200\\150\end{matrix}$ rpm.



8 THROTTLE AND CHOKE CONTROL CABLE (optional part)

The throttle and choke control levers are provided with holes for optional cable attachment. The following illustrations show installation examples for a solid wire cable and for a braided wire cable. If using a braided wire cable, add a return spring as shown. It is necessary to loosen the throttle lever friction nut when operating the throttle with a remote cable.



9 TRANSPORTING/STORAGE

⚠WARNING

When transporting the engine, turn the fuel valve OFF and keep the engine level to prevent fuel spillage. Fuel vapor or spilled fuel may ignite.

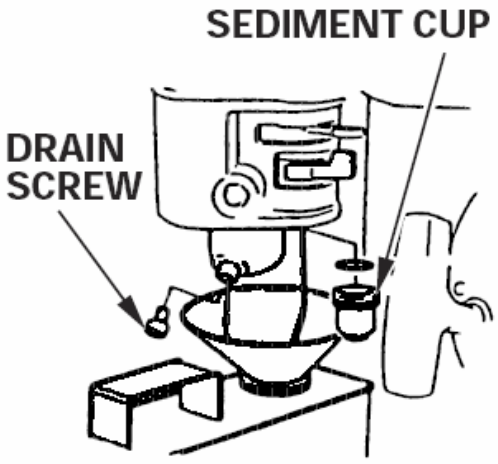
Befor storing the unit for an extended period;

1. Be sure the storage area is free of excessive humidity and dust.
2. Drain the fule..

⚠WARNING

Gasoline is extremely flammable and is explosive under certain conditions. Do not smoke or allow flames or sparks in the area.

a. With the fuel valve in the OFF position, remove and empty the sediment cup.
b. Turn the fuel valve to the ON position and drain the gasoline from the fuel tank into a suitable container.
c. Replace the sediment cup and tighten securely.
d. Drain the carbretor by loosening the drain screw. Drain the gasoline into a suitable container.



3. Change the engine oil (page 20).
4. Remove the spark plug and pour about a tablespoon of clean engine oil into the cylinder.
   Crank the engine several revolutions to distribute the oil, then reinstall the spark plug.
5. Pull the starter rope slowly until resistance is felt.Continue polling until the notch on the starter pulley aligns with the hole on the recoil starter (see illustration below). At this point, the intake and exhaust valves are closed, and this will help to protect the engine from internal corrosion.

Align the mark on the starter pulley with the hole at the top of recoil starter.

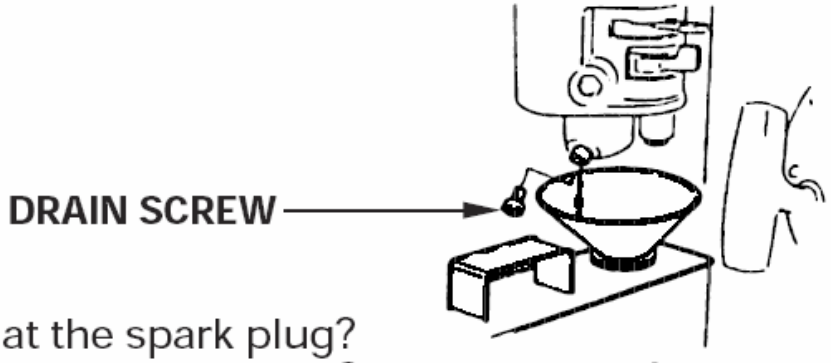
6. Electric starter type: Remove the battery and store it in a cool;, dry place. Recharge it once a month.
7. Cover the engine to keep out dust.

10 TROUBLESHOOTING

Engine will not start using recoil starter:
1. Is the engine switch in the ON position?
2. Is there enough oil in the engine?
3. Is the fuel valve ON?
4. Is there fuel in the fuel tank?
5. Is gasoline reaching the carburetor?
   To check,loosen the drain screw with the fuel valve ON?

⚠WARNING

If any fuel is spilled, make sure the area is dry before testing the spark plug or starting the engine. Fuel vapor or spilled fuel may ignite.



6. Is there a spark at the spark plug?
   a. Remove the spark plug cap. Clean any dirt from around the spark plug base, then remove the spark plug.
   b. Install the spark plug in the plug cap.
   c. Turn the engine switch ON.
   d. Grounding the side electrode to any engine ground, pull the recoil starter to see if sparks jump across the gap.
   e. If there is no spark, replace the plug.
      If OK, reinstall the spark plug and try to start the engine again according to the instructions.
7. If the engine still dose not start, take the engine to an authorized Honda dealer.

Engine will not start, using electric starter:
1. Are the battery cables securely connected and free of corrosion?
2. Is the battery fully charged?

NOTE:
If the engine does not charge the battery, check the circuit breaker.
3. If the starter motor operates, but the engine wil not start, follow the troubleshooting procedure described under recoil starter operation.

11 SPECIFICATIONS

*Dimensions	GX 120	GX 160	GX 200
Power equipment description code	GC01	GC02	GCAE
Length	300 mm (11.8 in)	305 mm (12.0 in)	313 mm (12.3 in)
Width	345 mm (13.6 in)	365 mm (14.4 in)	376 mm (14.8 in)
Height	320 mm (12.6 in)	335 mm (13.2 in)	335 mm (13.2 in)
〈 Length 〉		〈 305 mm (12.0 in) 〉	〈 313 mm (12.3 in) 〉
〈 Width 〉		〈 385 mm (15.2 in) 〉	〈 395 mm (15.6 in) 〉
〈 Height 〉		〈 335 mm (13.2 in) 〉	〈 335 mm (13.2 in) 〉
Dry weight	12.0 kg (26.5 lbs)	14.0 kg (30.9 lbs)	16.0 kg (35.3 lbs)
		〈 16.0 kg (35.3 lbs) 〉	〈 17.9 kg (39.5 lbs) 〉

〈 〉: Electric starter model

Engine

Engine type	4-stroke, over head valve, 1 cylinder		
Displacement	118 cm³ (7.2 cu-in)	163 cm³ (9.9 cu-in)	196 cm³ (12.0 cu-in)
Bore × Stroke	60 x 42 mm (2.4 x 1.7 in)	68 x 45 mm (2.7 x 1.8 in)	68 x 54 mm (2.7 x 2.1 in)
Max. output	2.9 kW/4,000 rpm	4 kW/4,000 rpm	4.8 kW/3,600 rpm
Max. torque	0.75 kg-m (5.4 ft-lb)/ 2,500 rpm	1.1 kg-m (8.0 ft-lb)/ 2,500 rpm	1.35 kg-m (9.8 ft-lb)/ 2,500 rpm
Fuel consumption	230 g/PSh		
Cooling system	Forced air		
Ignition system	Transister magneto		
PTO shaft rotation	Counterclockwise		

*: "S" type

NOTE:
Specifications may vary according to the types, and are subject to change without notice.

With cyclone air cleaner

*Dimensions	GX 120	GX 160	GX 200
Power equipment description code	GC01	GC02	GCAE
Length	310 mm (12.2 in)	345 mm (13.6 in)	313 mm (12.3 in)
Width	410 mm (16.1 in)	420 mm (16.5 in)	430 mm (16.9 in)
Height	325 mm (12.8 in)	335 mm (13.2 in)	335 mm (13.2 in)
Dry weight	12.0 kg (26.5 lbs)	14.0 kg (30.9 lbs)	16.0 kg (35.3 lbs)

Engine

Engine type	4-stroke, over head valve, 1 cylinder		
Displacement	118 cm^3 (7.2 cu-in)	163 cm^3 (9.9 cu-in)	196 cm^3 (12.0 cu-in)
Bore × Stroke	60 x 42 mm (2.4 x 1.7 in)	68 x 45 mm (2.7 x 1.8 in)	68 x 54 mm (2.7 x 2.1 in)
Max. output	2.9 kW/4,000 rpm	4 kW/4,000 rpm	4.8 kW/3,600 rpm
Max. torque	0.75 kg-m (5.4 ft-lb)/ 2,500 rpm	1.1 kg-m (8.0 ft-lb)/ 2,500 rpm	1.35 kg-m (9.8 ft-lb)/ 2,500 rpm
Fuel consumption	230 g/PSh		
Cooling system	Forced air		
Ignition system	Transister magneto		
PTO shaft rotation	Counterclockwise		

*: "S" type

NOTE:
Specifications may vary according to the types, and are subject to change without notice.