

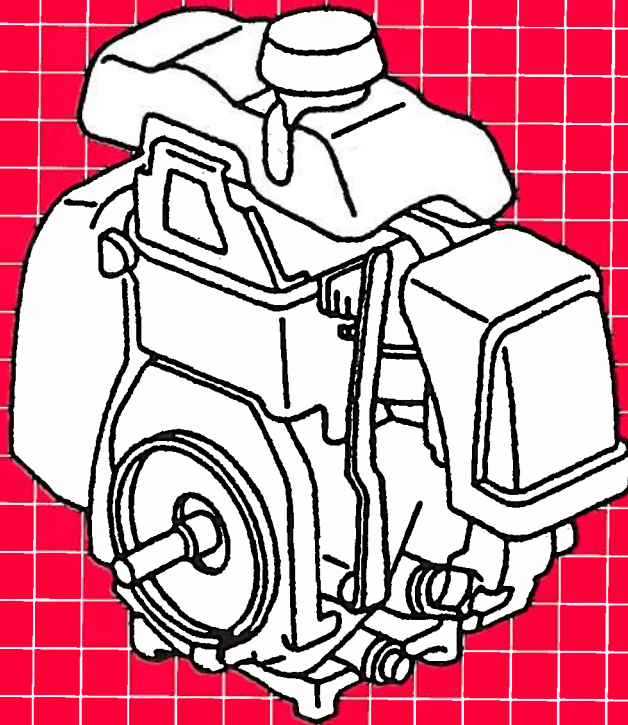
# **HONDA<sup>®</sup>**

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# **ENGINES**

# **SHOP MANUAL**

## **GXH50**



# A FEW WORDS ABOUT SAFETY

## SERVICE INFORMATION

The service and repair information contained in this manual is intended for use by qualified, professional technicians. Attempting service or repairs without proper training, tools, and equipment could cause injury to you or others. It could also damage the engine or create an unsafe condition.

This manual describes the proper methods and procedures for performing service, maintenance, and repairs. Some procedures require the use of special tools. Any person who intends to use a replacement part, service procedure, or a tool that is not recommended by Honda, must determine the risks to their personal safety and the safe operation of the engine.

If you need to replace a part, use genuine Honda parts with the correct part number, or an equivalent part. We strongly recommend that you do not use replacement parts of inferior quality.

### For Your Customer's Safety

Proper service and maintenance are essential to the customer's safety and the reliability of the engine. Any error or oversight while servicing an engine can result in faulty operation, damage to the engine, or injury to others.

### For Your Safety

Because this manual is intended for the professional service technician, we do not provide warnings about many basic shop safety practices (eg, Hot parts – wear gloves). If you have not received shop safety training or do not feel confident about your knowledge of safe servicing practices, we recommend that you do not attempt to perform the procedures described in this manual.

Some of the most important general service safety precautions are given below. However, we cannot warn you of every conceivable hazard that can arise in performing service and repair procedures. Only you can decide whether or not you should perform a given task.

### Important Safety Precautions

- Make sure you have a clear understanding of all basic shop safety practices and that you are wearing appropriate clothing and using safety equipment. When performing any service task, be especially careful of the following:
  - Read all of the instructions before you begin, and make sure you have the tools, the replacement or repair parts, and the skills required to perform the tasks safely and completely.
  - Protect your eyes by using proper safety glasses, goggles, or face shields any time you hammer, drill, grind, or work around pressurized air or liquids, and springs or other stored-energy components. If there is any doubt, put on eye protection.
  - Use other protective wear when necessary, for example, gloves or safety shoes. Handling hot or sharp parts can cause severe burns or cuts. Before you grab something that looks like it can hurt you, stop and put on gloves.
  - Protect yourself and others whenever you have engine-powered equipment up in the air. Any time you lift equipment either with a hoist or a jack, make sure that it is always securely supported. Use jack stands.
- Make sure the engine is off before you begin any servicing procedures, unless the instruction tells you to do otherwise. This will help eliminate several potential hazards:
  - Carbon monoxide poisoning from engine exhaust. Be sure there is adequate ventilation whenever you run the engine.
  - Burns from hot parts. Let the engine and exhaust system cool before working in those areas.
  - Injury from moving parts. If the instruction tells you to run the engine, be sure your hands, fingers, and clothing are out of the way.
- Gasoline vapors are explosive. To reduce the possibility of a fire or explosion, be careful when working around gasoline.
  - Use only a nonflammable solvent, not gasoline, to clean parts.
  - Never drain or store gasoline in an open container.
  - Keep all cigarettes, sparks, and flames away from all fuel-related parts.

### WARNING

Improper service or repairs can create an unsafe condition that can cause your customer or others to be seriously hurt or killed.

Follow the procedures and precautions in this manual and other service materials carefully.

### WARNING

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

Follow the procedures and precautions in this manual carefully.

### INTRODUCTION

This manual covers service and repair procedures for Honda GXH50 engines.

All information contained in this manual is based on the latest product information available at the time of printing. We reserve the right to make changes at any time without notice.


No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form, by any means, electronic, mechanical, photocopying, recording, or otherwise, without prior written permission of the publisher. This includes text, figures, and tables.

As you read this manual, you will find information that is preceded by a **NOTICE** symbol. The purpose of this message is to help prevent damage to the engine, other property, or the environment.

### SAFETY MESSAGES

Your safety, and the safety of others, are very important. To help you make informed decisions, we have provided safety messages and other safety information throughout this manual. Of course, it is not practical or possible to warn you about all the hazards associated with servicing these engines. 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.

- **Instructions** — how to service this engine correctly and safely.

**HONDA MOTOR CO., LTD.  
SERVICE PUBLICATION OFFICE**

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3. DIMENSIONAL DRAWINGS

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## 1. SPECIFICATIONS DIMENSIONS AND WEIGHTS

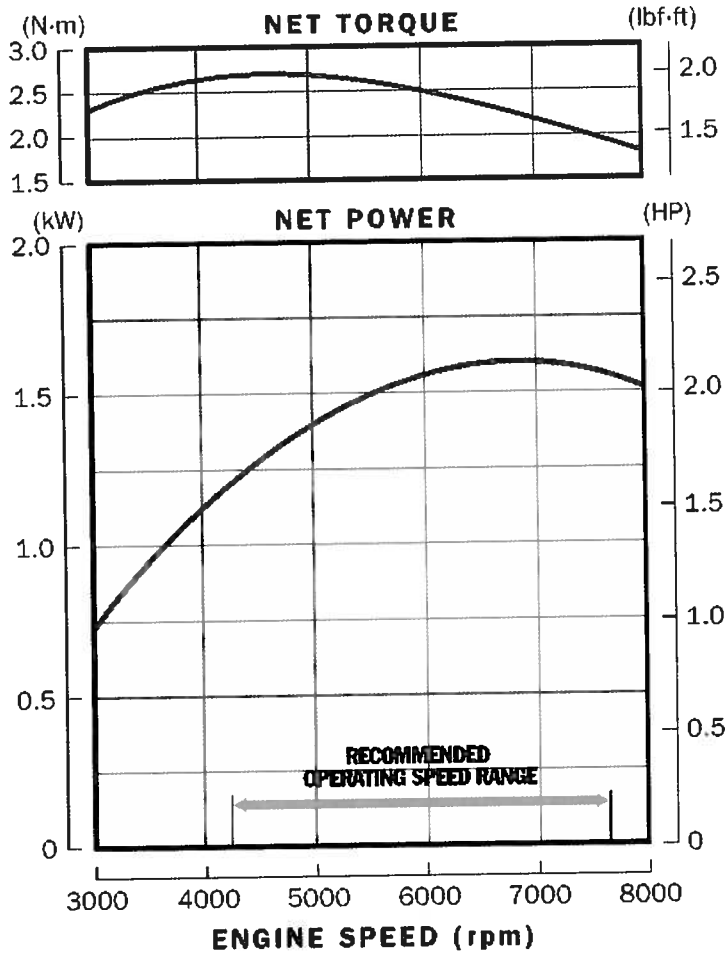
Model	GXH50		
Description code	GCAL		
Type	S	Q	W
Overall length	225 mm (8.9 in)		239 mm (9.4 in)
Overall width	274 mm (10.8 in)		
Overall height	353 mm (13.9 in)		
Dry weight	5.5 kg (12.13 lb)		
Operating weight	6.6 kg (14.55 lb)		

## ENGINE

Type	4-stroke, overhead valve single cylinder
Displacement	49 cm <sup>3</sup> (2.99 cu in)
Bore x stroke	41.8 x 36.0 mm (1.65 x 1.42 in)
Net power* (in accordance with SAE J1349)	1.6 kW (2.1 hp) at 7,000 min <sup>-1</sup> (rpm)
Max. net torque* (in accordance with SAE J1349)	2.7 N•m (2.0 lbf•ft) at 4,500 min <sup>-1</sup> (rpm)
Compression ratio	8.0 : 1
Fuel consumption	0.91 l/h at 7,000 min <sup>-1</sup> (rpm)
Cooling system	Forced air
Ignition system	Transistorized magneto ignition
Ignition timing	30° B.T.D.C.
Spark plug	NGK: CR5HSB DENSO: U16FSR-UB
Carburetor	Float type
Air cleaner	Semi-dry type
Lubrication system	Forced splash
Oil capacity	0.25 l (0.26 US qt, 0.22 Imp qt)
Recommended operating ambient temperature	- 5°C - 40°C (23°F - 104°F)
Starting system	Recoil starter
Stopping system	Ground
Fuel used	Automotive unleaded gasoline with a pump octane number 86 or higher
Fuel tank capacity	0.77 l (0.81 US qt)
PTO shaft rotation	Counterclockwise (viewed from PTO side)

\* The power rating of the engine indicated in this document is the net power output tested on a production engine for the engine model and measured in accordance with SAE J1349 at 7000 rpm (Net power) and at 4,500 rpm (Max net torque). Mass production engines may vary from this value. Actual power output for the engine installed in the final machine will vary depending on numerous factors, including the operating speed of the engine in application, environmental conditions, maintenance, and other variables.

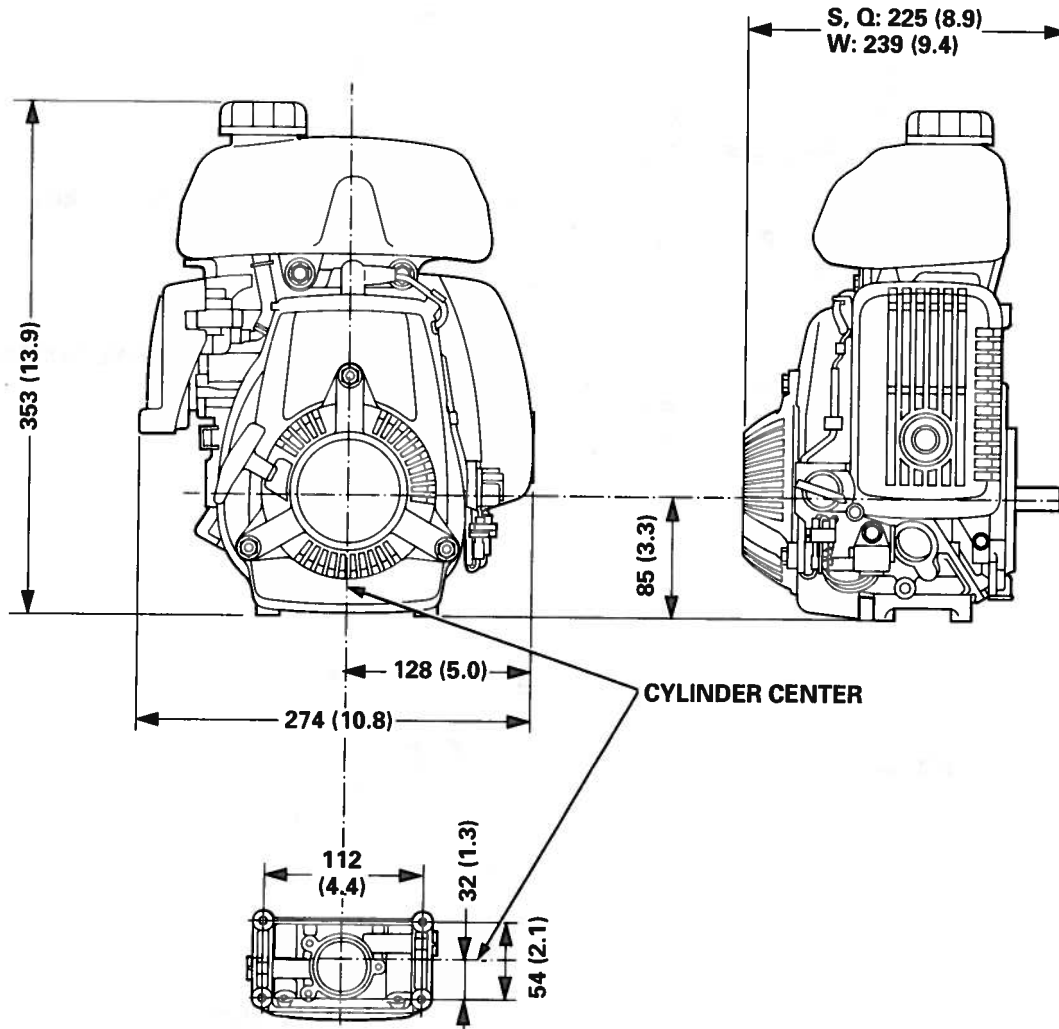
**2. PERFORMANCE CURVE**



NEW

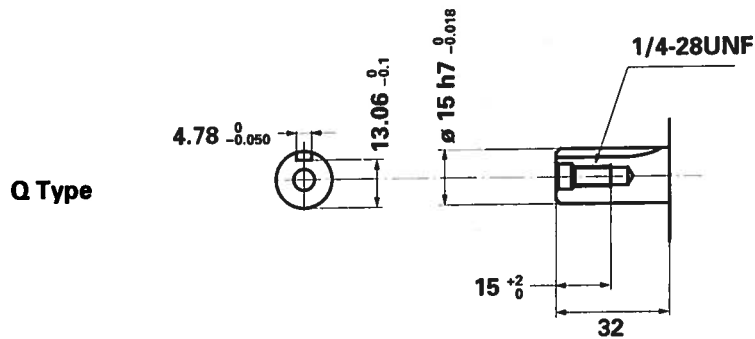
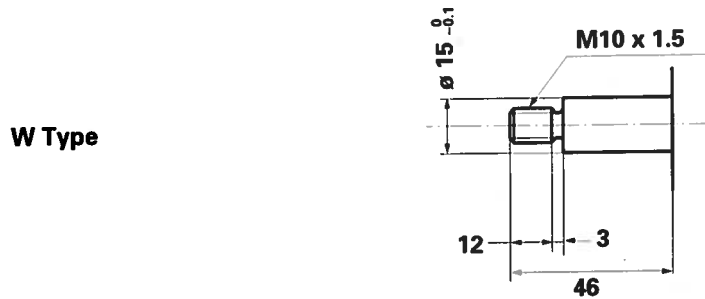
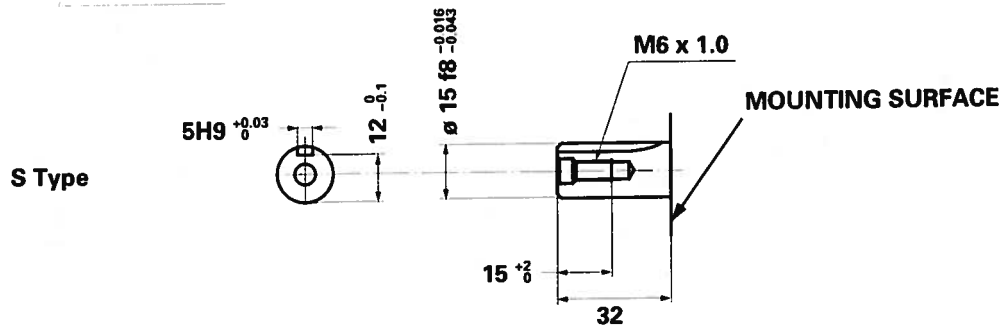
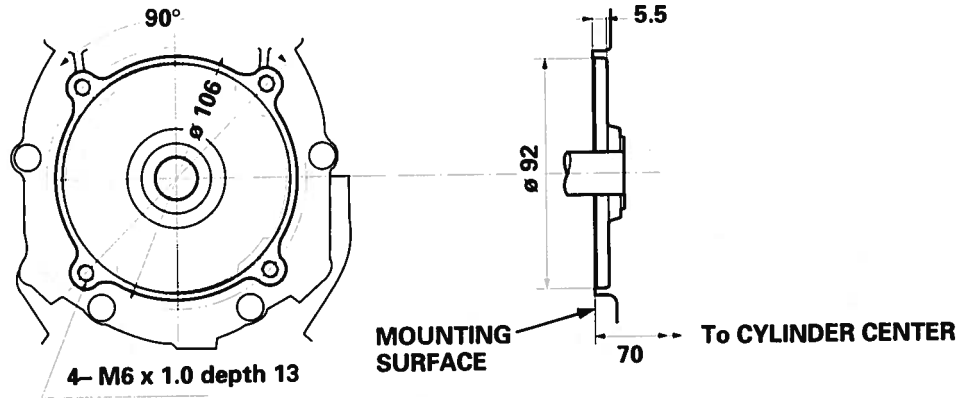
**3. DIMENSIONAL DRAWINGS**

Unit: mm (in)



### 4. PTO DIMENSIONAL DRAWINGS

Unit: mm







- 1. SYMBOLS USED IN THIS MANUAL
- 2. SERIAL NUMBER LOCATION
- 3. MAINTENANCE STANDARDS

- 4. TORQUE VALUES
- 5. SPECIAL TOOLS
- 6. TROUBLESHOOTING

## 1. SYMBOLS USED IN THIS MANUAL

As you read this manual, you may find the following symbols with the instructions.



A special tool is required to perform the procedure.



Apply grease.



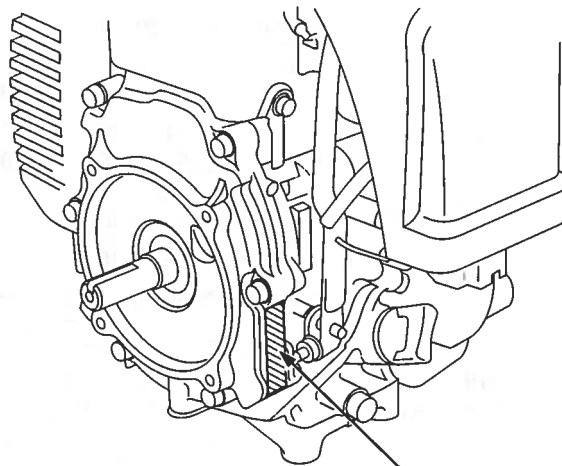
Apply oil.

○ x ○ (○): Indicates the diameter, length, and quantity of metric flange bolt used.

P. ○-○ Indicates the reference page.

## 2. SERIAL NUMBER LOCATION

The engine serial number is stamped on the cylinder block. Refer to these numbers when ordering or making technical inquiries.



ENGINE SERIAL NUMBER

### 3. MAINTENANCE STANDARDS

Part	Item	Standard	Service limit	
Engine	Maximum speed (no load)	7,800 ± 150 min <sup>-1</sup> (rpm)	—	
	Idle speed	2,500 ± 200 min <sup>-1</sup> (rpm)	—	
	Cylinder compression	0.42 MPa (4.3 kgf/cm <sup>2</sup> ) 61.2 psi at 1,000 min <sup>-1</sup> (rpm)	—	
Cylinder	Sleeve I.D.	41.800 – 41.815 mm (1.6457 – 1.6463 in)	41.900 mm (1.6496 in)	
Piston	Skirt O.D.	41.770 – 41.790 mm (1.6445 – 1.6453 in)	41.700 mm (1.6417 in)	
	Piston-to-cylinder clearance	0.010 – 0.045 mm (0.0004 – 0.00187 in)	0.120 mm (0.0047 in)	
	Pin bore I.D.	10.002 – 10.008 mm (0.3938 – 0.3940 in)	10.050 mm (0.3957 in)	
Piston pin	O.D.	9.994 – 10.000 mm (0.3935 – 0.3937 in)	9.950 mm (0.3917 in)	
	Pin-to-piston clearance	0.002 – 0.014 mm (0.0001 – 0.0006 in)	0.100 mm (0.0039 in)	
Piston rings	Ring width	Top 0.77 – 0.79 mm (0.030 – 0.031 in)	0.720 mm (0.0283 in)	
		Second 0.97 – 0.99 mm (0.038 – 0.039 in)	0.920 mm (0.0362 in)	
	Ring side clearance	Top/Second 0.015 – 0.050 mm (0.0006 – 0.0020 in)	0.120 mm (0.0047 in)	
	Ring end gap	Top/Second 0.150 – 0.300 mm (0.0059 – 0.0118 in)	0.600 mm (0.0236 in)	
Connecting rod	Small end I.D.	10.006 – 10.017 mm (0.3939 – 0.3944 in)	10.050 mm (0.3957 in)	
	Big end I.D.	15.000 – 15.011 mm (0.5906 – 0.5910 in)	15.040 mm (0.5921 in)	
	Big end oil clearance	0.016 – 0.038 mm (0.0006 – 0.0015 in)	0.100 mm (0.0039 in)	
	Big end side clearance	0.1 – 0.6 mm (0.004 – 0.024 in)	0.8 mm (0.031 in)	
Crankshaft	Crank pin O.D.	14.973 – 14.984 mm (0.5895 – 0.5899 in)	14.940 mm (0.5882 in)	
Valves	Valve clearance	IN	0.08 ± 0.02 mm	—
		EX	0.11 ± 0.02 mm	—
	Stem O.D.	IN	3.970 – 3.985 mm (0.1563 – 0.1569 in)	3.900 mm (0.1535 in)
		EX	3.935 – 3.950 mm (0.1549 – 0.1555 in)	3.880 mm (0.1528 in)
	Stem-to-guide clearance	IN	0.015 – 0.048 mm (0.0006 – 0.0019 in)	0.098 mm (0.0039 in)
		EX	0.050 – 0.083 mm (0.0020 – 0.0033 in)	0.098 mm (0.0039 in)
Valve springs	Free length	IN/EX 23.7 mm (0.93 in)	22.8 mm (0.90 in)	
Cam	Cam height	IN/EX 27.972 mm (1.1013 in)	26.972 mm (1.0619 in)	
	I.D. (bearing)	5.020 – 5.050 mm (0.1976 – 0.1988 in)	5.100 mm (0.2008 in)	
Camshaft	O.D.	4.990 – 5.000 mm (0.1965 – 0.1969 in)	4.950 mm (0.1949 in)	
Valve lifters	I.D. (bearing)	5.005 – 5.025 mm (0.1970 – 0.1978 in)	5.050 mm (0.1988 in)	
Valve lifter shaft	O.D.	4.990 – 5.000 mm (0.1965 – 0.1969 in)	4.950 mm (0.1949 in)	
Crankcase side cover	Cam shaft	Bearing I.D. 5.005 – 5.023 mm (0.1970 – 0.1978 in)	5.050 mm (0.1988 in)	
	Valve lifter shaft	Bearing I.D. 5.005 – 5.023 mm (0.1970 – 0.1978 in)	5.050 mm (0.1988 in)	
Cylinder block	Cam shaft	Bearing I.D. 5.005 – 5.023 mm (0.1970 – 0.1978 in)	5.050 mm (0.1988 in)	
	Valve lifter shaft	Bearing I.D. 5.005 – 5.023 mm (0.1970 – 0.1978 in)	5.050 mm (0.1988 in)	
	Rocker arm shaft	Bearing I.D. 4.000 – 4.018 mm (0.1575 – 0.1582 in)	4.050 mm (0.1594 in)	
	Valve guide I.D.	IN/EX 4.000 – 4.018 mm (0.1575 – 0.1582 in)	4.060 mm (0.1598 in)	
Rocker arms	I.D. (bearing)	4.005 – 4.025 mm (0.1577 – 0.1585 in)	4.050 mm (0.1594 in)	
Rocker arm shaft	O.D.	3.990 – 4.000 mm (0.1571 – 0.1575 in)	3.950 mm (0.1555 in)	
Spark plug	Gap	0.6 – 0.7 mm (0.024 – 0.028 in)	—	
Ignition coil	Resistance	Primary coil	0.98 – 1.20 Ω	—
		Secondary coil	8.0 – 10.0 kΩ	—
	Air gap	0.3 – 0.5 mm (0.012 – 0.020 in)	—	
Carburetor	Main jet	#55	—	
	Float height	12 mm (0.47 in)	—	
	Pilot screw opening	1 1/8 turns out	—	

### 4. TORQUE VALUES

Item	Thread dia. x pitch	Tightening torque		
		N-m	kgf-m	lbf-ft
Spark plug	M10 x 1.0	12	1.2	8.7
Crankcase side cover	M5 x 0.8 (CT)	7.4	0.75	5.4
Oil case bolt	M5 x 0.8 (CT)	7.4	0.75	5.4
Connecting rod bolt	M5 x 0.8	5.9	0.6	4.3
Valve cover bolt	M5 x 0.8 (CT)	5.9	0.6	4.3
Oil drain bolt	M8 x 1.25	11	1.1	8.0
Flywheel nut	M10 x 1.25	21.5	2.15	15.5
Fuel tank bolt	M6 x 1.0 (CT)	10	1.0	7.2
Ignition coil bolt	M5 x 0.8 (CT)	5.9	0.6	4.3
Fan cover stud bolt	M5 x 0.8 (CT)	5.9	0.6	4.3
Carburetor drain bolt	M6 x 1.0	4.4	0.45	3.3
Carburetor drain screw	M6 x 1.0	1.5	0.15	1.1
Carburetor drain knob	M6 x 1.0	1.2	0.12	0.9

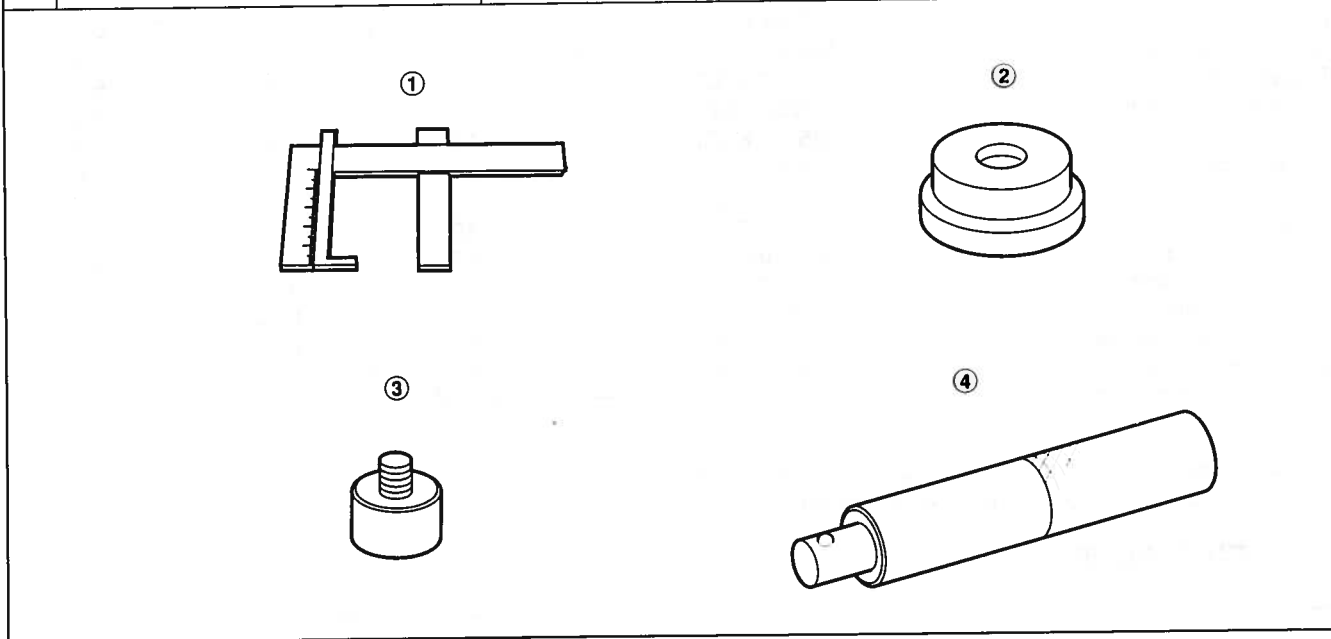
- Use standard torque values for the fasteners that are not listed in this table.
- CT (Cutting Thread) indicates a self-tapping bolt.

### STANDARD TORQUE

Item	Thread dia. x pitch	Tightening torque		
		N-m	kgf-m	lbf-ft
Flange bolt and nut	4 mm	3.4	0.35	2.5
	5 mm	5.4	0.55	4.0
	6 mm	9.8	1.0	7.2
Screw	3 mm	1.0	0.1	0.7
	4 mm	2.0	0.2	1.4
CT flange bolt	5 mm	5.4	0.55	4.0

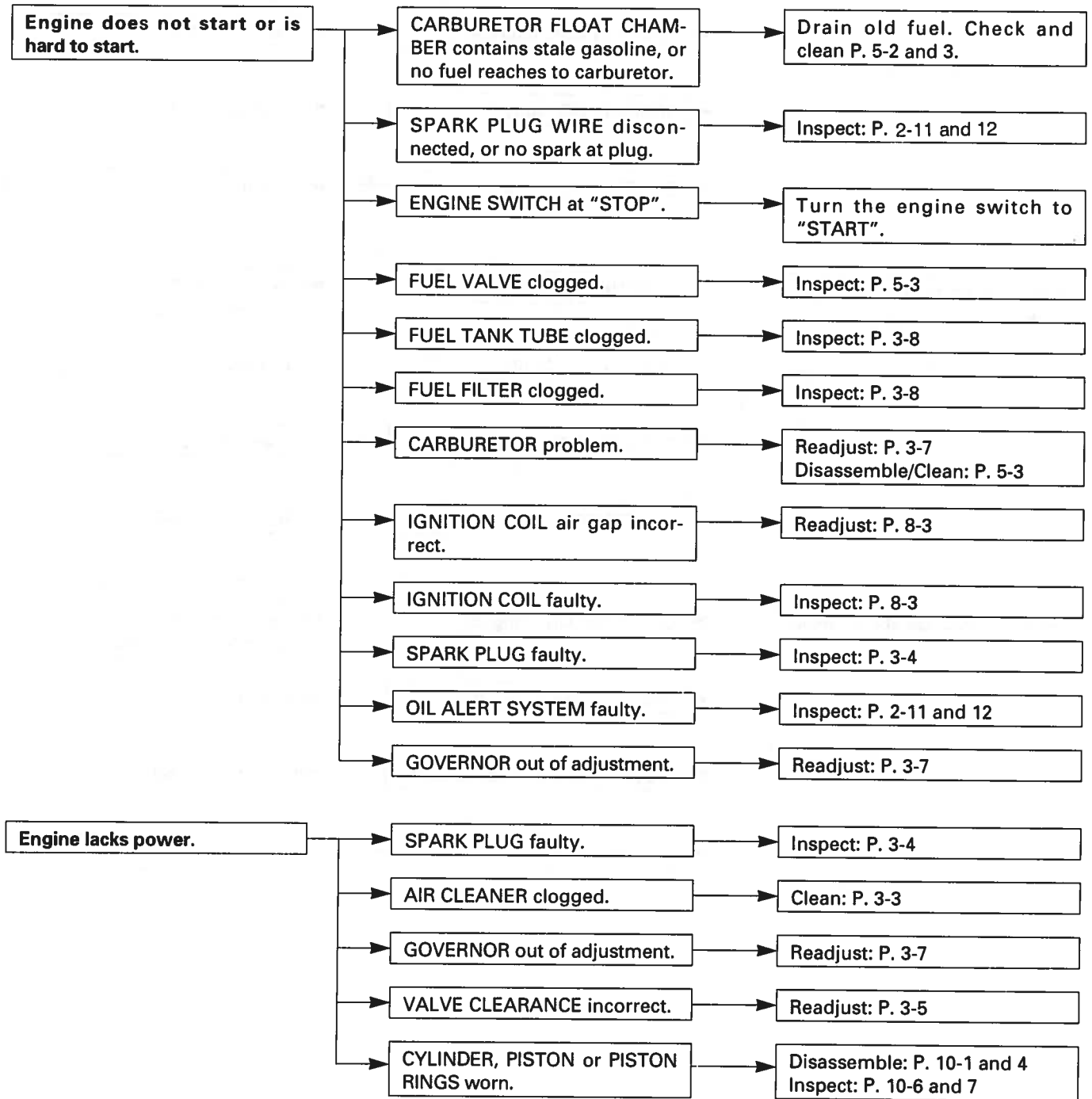
**5. SPECIAL TOOLS**

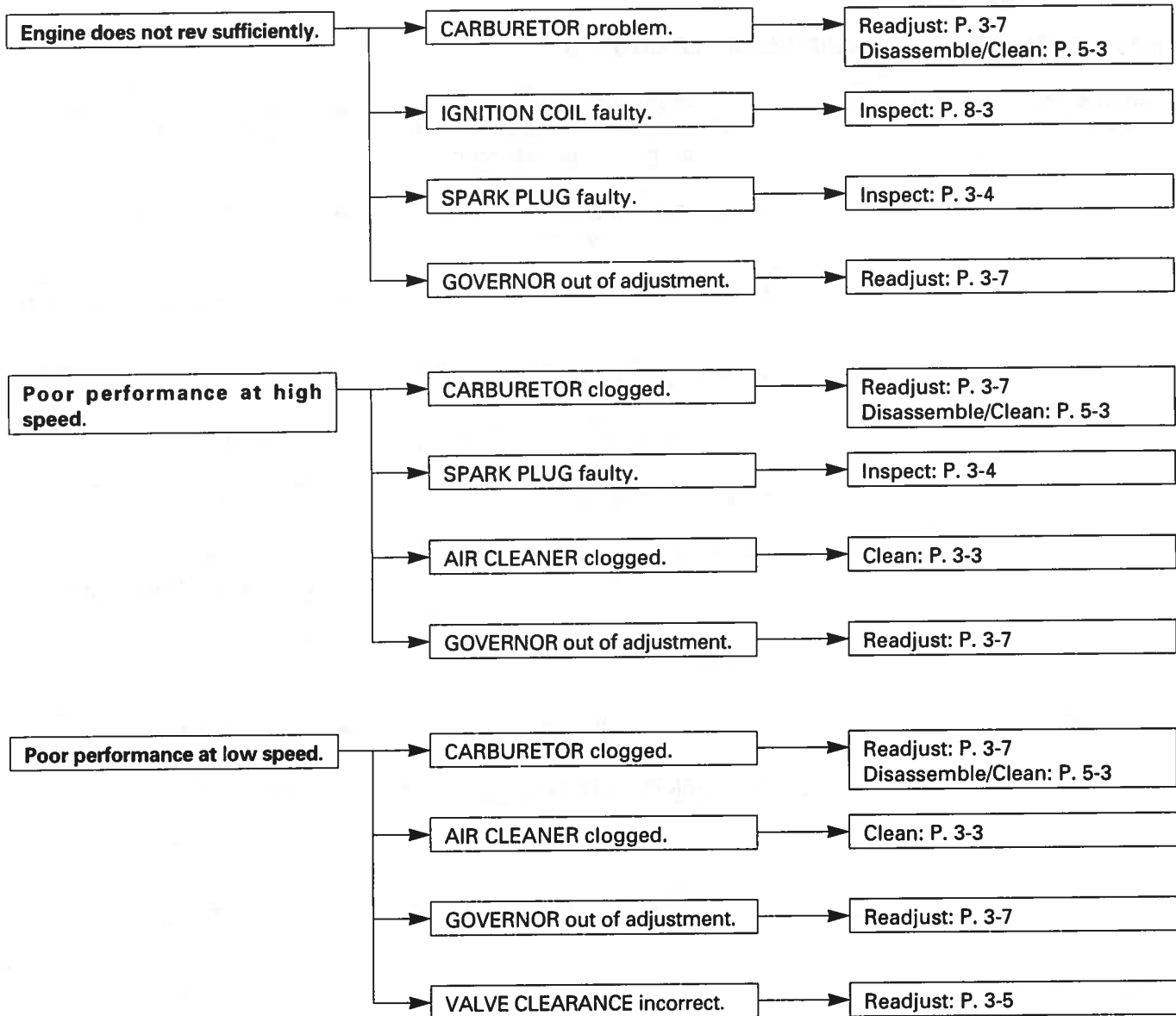
No.	Tool name	Tool number	Application
1.	Float level gauge	07401 - 0010000	Carburetor float level inspection
2.	Attachment, 24 x 26 mm	07746 - 0010700	17 x 27 x 5 mm oil seal installation
3.	Pilot, 17 mm	07746 - 0040400	17 x 27 x 5 mm oil seal installation
4.	Driver	07749 - 0010000	Used together with the No. 3 tool



**6. TROUBLESHOOTING**

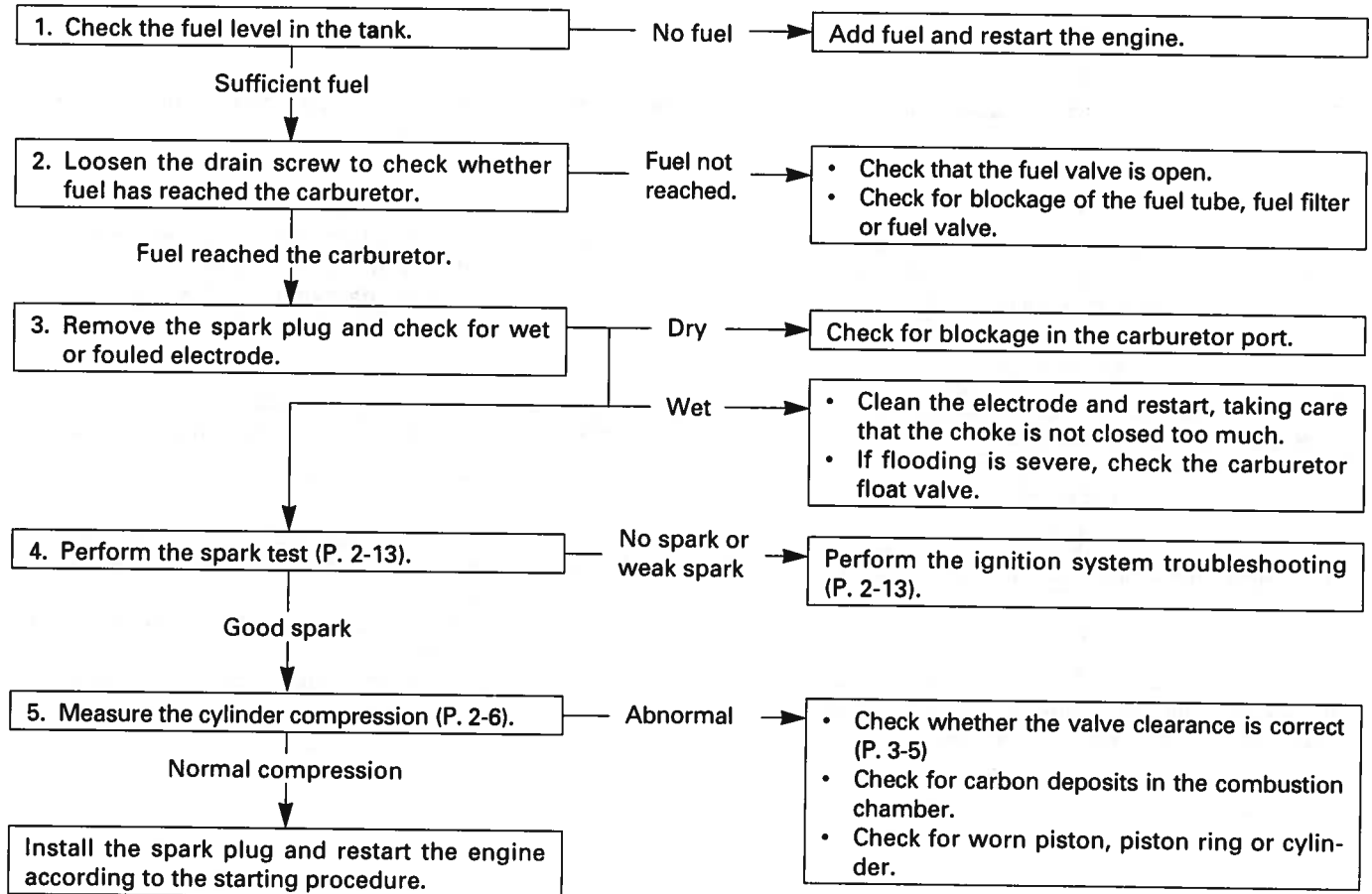
**a. GENERAL SYMPTOMS AND POSSIBLE CAUSES**





### a. ENGINE

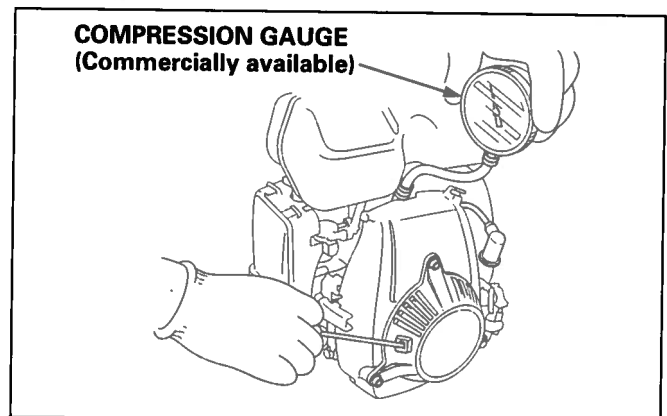
#### • Hard Starting



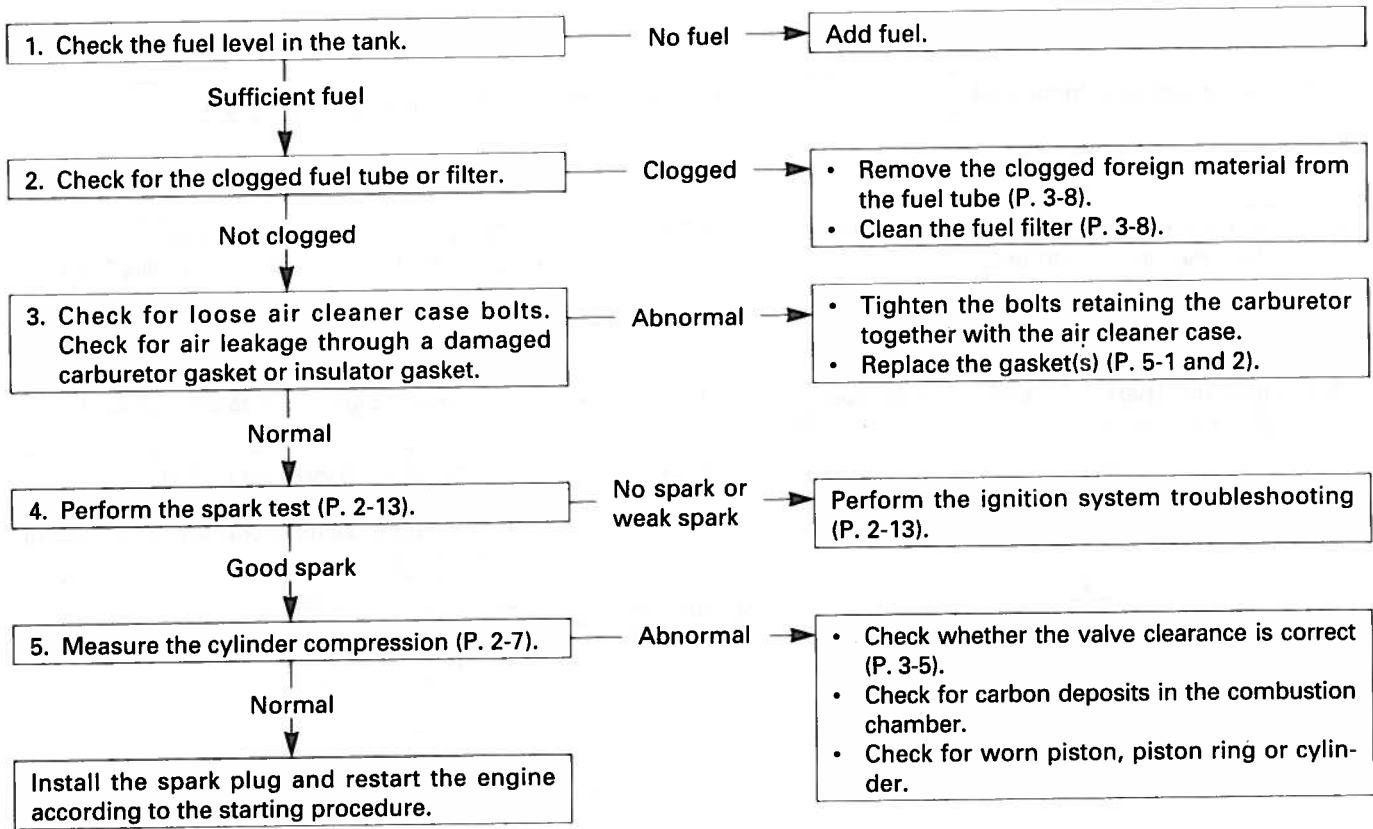
#### • CYLINDER COMPRESSION CHECK

- 1) Remove the spark plug cap and spark plug, and install a compression gauge in the spark plug hole.
- 2) Pull the recoil starter several times with force and measure the cylinder compression.

Cylinder compression	0.42 MPa (4.3 kgf/cm <sup>2</sup> , 61.2 psi) at 1,000 min <sup>-1</sup> (rpm)
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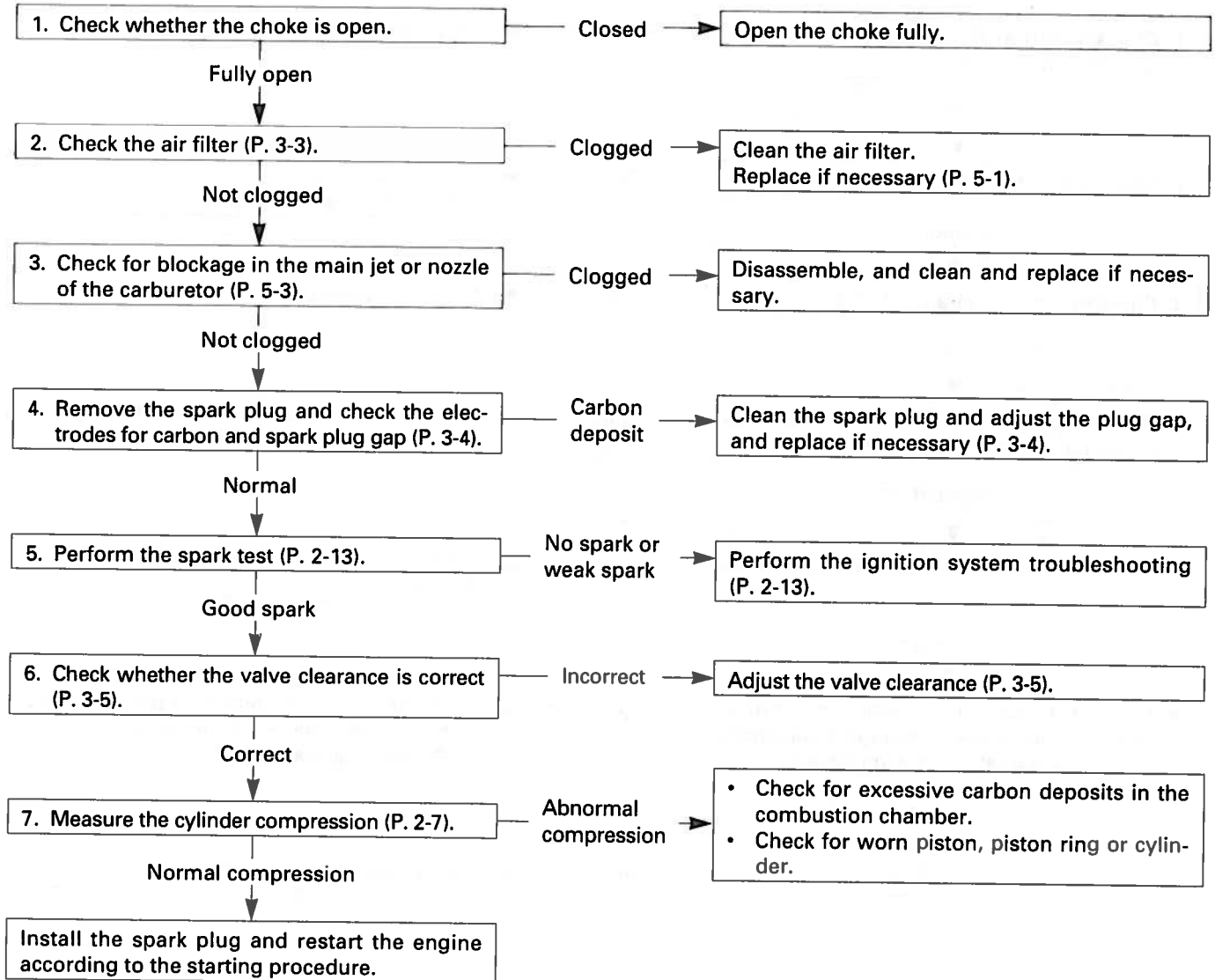


### • Engine Starts But Then Stalls

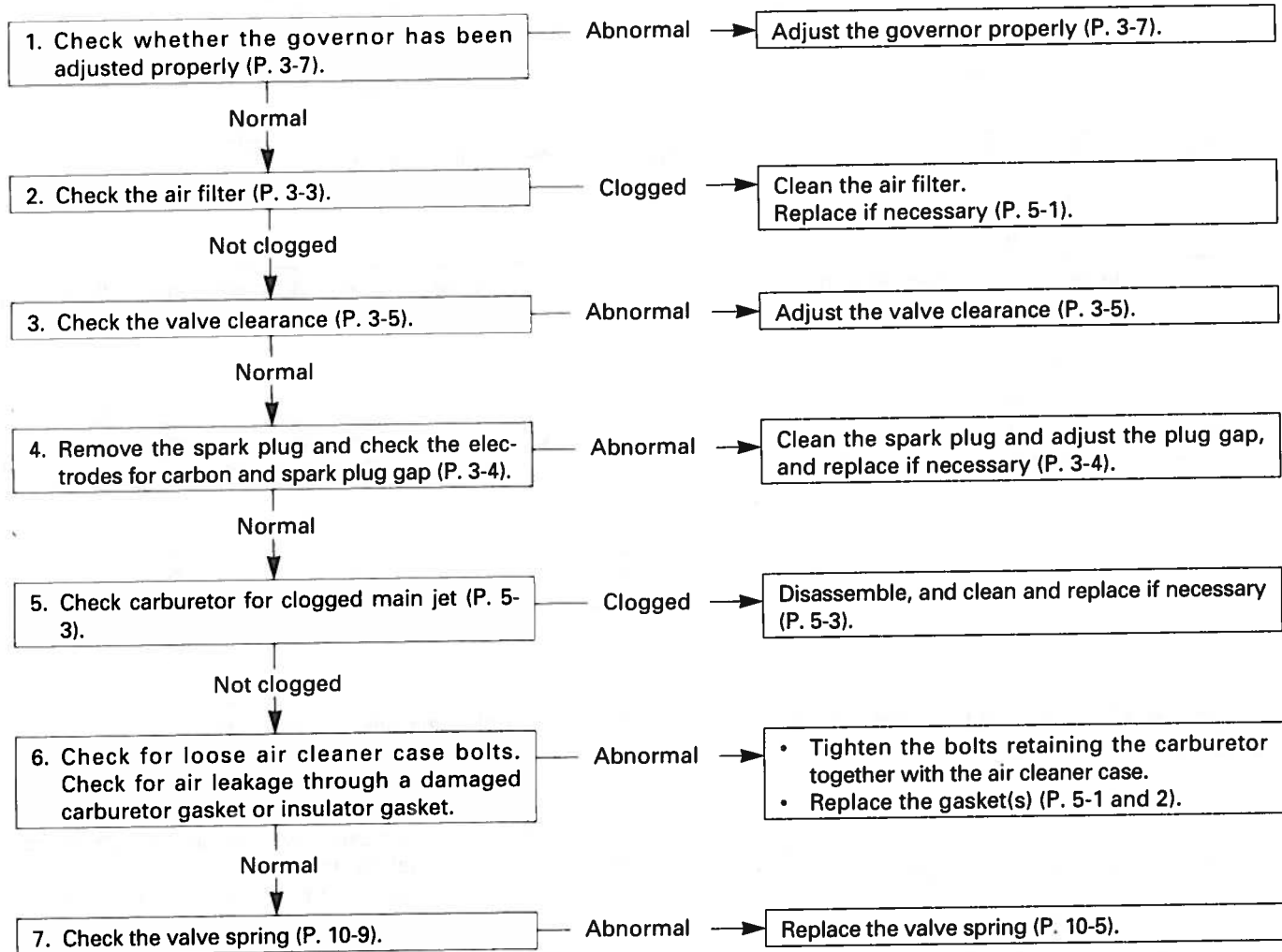




### • Engine Lacks Power



### • Engine Speed Does Not Increase

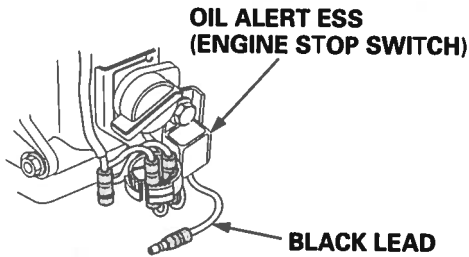


### c. OIL ALERT SYSTEM

#### • Engine Does Not Start with Engine Switch "ON"

- Check the engine oil level before inspection. There must be sufficient oil in the tank.

1. Disconnect the black lead of the oil alert ESS and perform the spark test (P. 2-13).

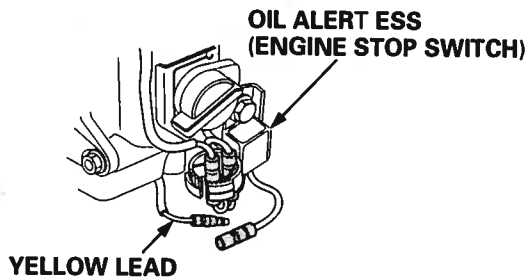


No spark →

Perform the ignition system troubleshooting (P. 2-13).

Good spark ↓

2. Reconnect the black lead. Disconnect the yellow lead of the oil level switch and perform the spark test (P. 2-13).



Good spark →

Oil level switch is faulty.  
• Replace the oil level switch (P. 10-1).

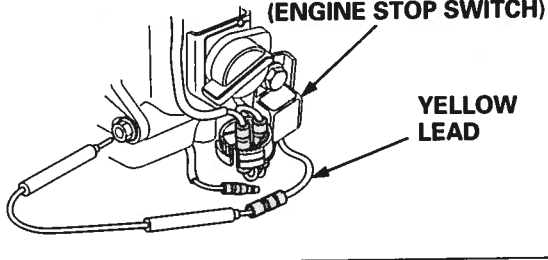
No spark ↓

Oil alert ESS is faulty.  
• Replace the oil alert ESS (P. 7-4).

### • Engine Does Not Stop While Engine Oil Level Is Low

- Drain the engine oil before inspection.

1. Ground the yellow lead of the oil alert ESS side against the engine and perform the spark test (P. 2-13). **OIL ALERT ESS (ENGINE STOP SWITCH)**



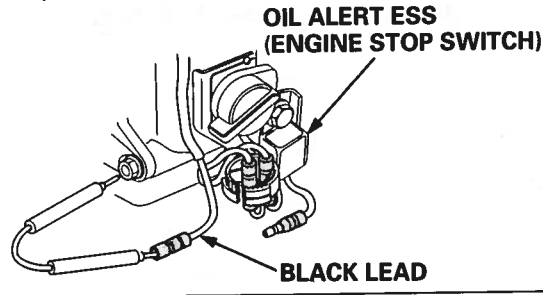
No spark →

Oil level switch is faulty.

- Replace the oil level switch (P. 10-1).

Good spark ↓

2. Ground the black lead that is connected to the oil alert ESS against the engine and perform the spark test (P. 2-13). **OIL ALERT ESS (ENGINE STOP SWITCH)**



No spark →

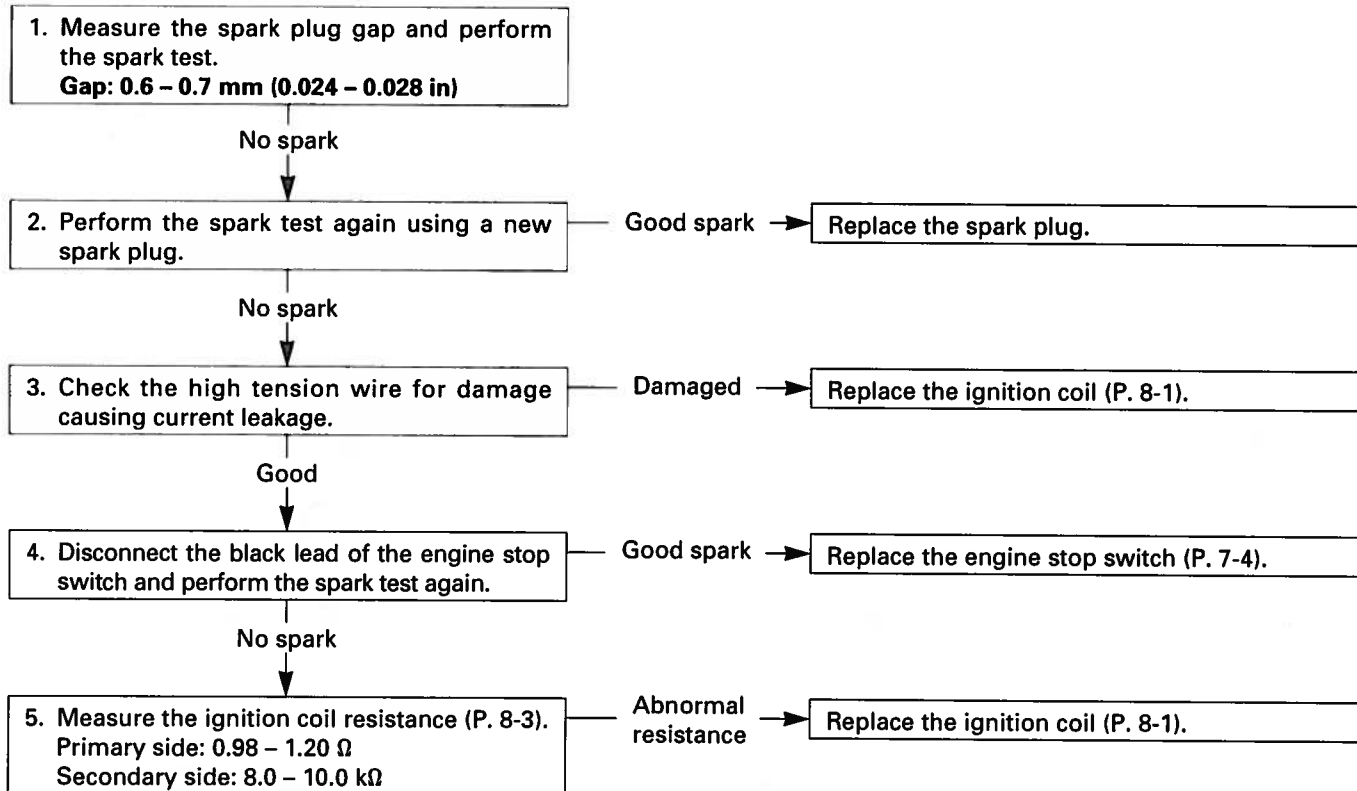
Oil alert ESS is faulty.

- Replace the oil alert ESS (P. 7-4).

Good spark ↓

Check for open in the black lead between the engine switch and ignition coil. If it is normal, replace the ignition coil.

### d. IGNITION SYSTEM



### • SPARK TEST

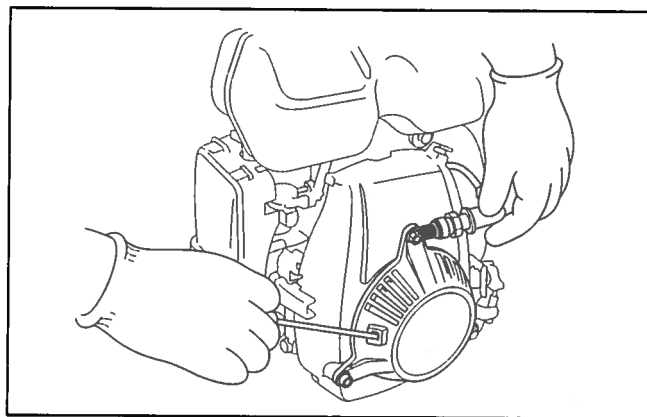
#### ⚠ WARNING

Gasoline is highly flammable and explosive. If ignited, gasoline can burn you severely.

- Be sure there is no spilled fuel near the engine.
- Place the spark plug away from the spark plug hole.

Unburnt gas can ignite if it is left in the cylinder.

- Loosen the carburetor drain screw to drain the carburetor thoroughly. Pull the recoil starter several times to release the unburnt gas from the cylinder before test.



- 1) Remove the spark plug cap and spark plug.
- 2) Turn the fuel valve OFF and drain the carburetor by loosening the drain screw. Then pull the recoil starter several times to release the unburnt gas in the cylinder with the engine switch OFF.
- 3) Attach the removed spark plug to the plug cap.
- 4) Set the engine switch to the "ON" position. Ground the negative (-) electrode (i.e. threaded part) of the spark plug against the recoil starter mounting nut and pull the recoil starter to check whether sparks jump across the electrodes.

1. MAINTENANCE SCHEDULE	6. VALVE CLEARANCE
2. OIL ALERT	7. CARBURETOR
3. ENGINE OIL	8. GOVERNOR
4. AIR CLEANER	9. FUEL FILTER/FUEL TANK/FUEL TUBE
5. SPARK PLUG	10. SPARK ARRESTER

**1. MAINTENANCE SCHEDULE**

ITEM	REGULAR SERVICE PERIOD (1) Perform at every indicated month or operating hour interval, whichever comes first.	Before use	First month or 10 Hrs.	Every season or 25 Hrs.	Every season or 50 Hrs.	Every 100 Hrs.	Every 200 Hrs.	Ref. page	
● Engine oil	Check	<input type="radio"/>						3-2	
	Change		<input type="radio"/>		<input type="radio"/> (2)				
● Air filter	Check	<input type="radio"/>						3-3	
	Clean			<input type="radio"/> (3)					
● Spark plug	Clean-Adjust					<input type="radio"/>		3-4	
	Replace						<input type="radio"/>		
Spark arrester	Clean					<input type="radio"/>		3-8	
● Fuel tank and filter	Clean					<input type="radio"/>		3-8	
● Idle speed	Check-Adjust					<input type="radio"/>		3-7	
● Valve clearance	Check-Adjust						<input type="radio"/>	3-5	
● Fuel tube	Check	Every 2 years (Replace if necessary)							3-8

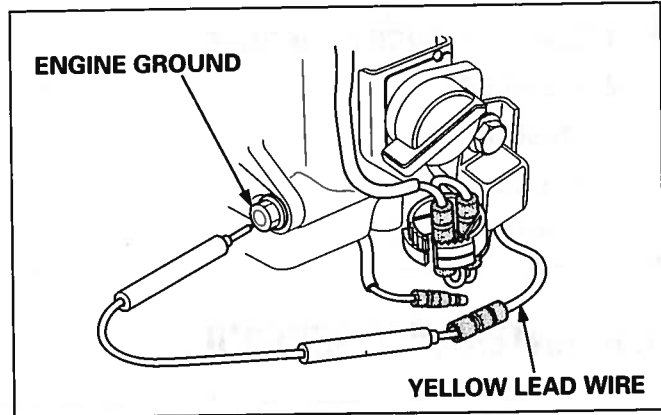
● Emission-related items.

- (1) For commercial use, log hours of operation to determine proper maintenance intervals.
- (2) Change engine oil every 25 hours when used under heavy load or in high ambient temperature.
- (3) Service more frequently when used in dusty areas.

## 2. OIL ALERT

- For convenience, perform this test in conjunction with the engine oil change.
- 1) With the engine running, disconnect the yellow lead from the oil alert ESS and ground against the engine. The oil alert ESS is normal if the engine stops.
  - 2) Drain the oil from the engine and reconnect the yellow lead connectors.
  - 3) Remove the spark plug and perform spark test (P. 2-13). There should be no spark.

Perform the troubleshooting "OIL ALERT SYSTEM on page 2-11 and IGNITION SYSTEM on page 2-13", if abnormal.



## 3. ENGINE OIL

### Oil Level Check

Check the engine oil level with the engine stopped and the engine on a level surface.

- 1) Remove the oil filler cap/dip stick and wipe it clean.
- 2) Insert the dip stick without screwing it into the oil filler neck. Remove the dip stick and check the oil level. If the oil does not stick on the dip stick, the oil level is low.
- 3) If the oil level is low, fill to the edge of the oil filler neck with the recommended oil. Do not overfill.

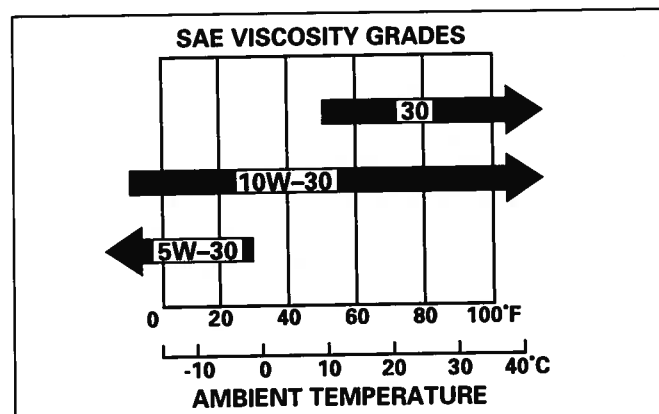
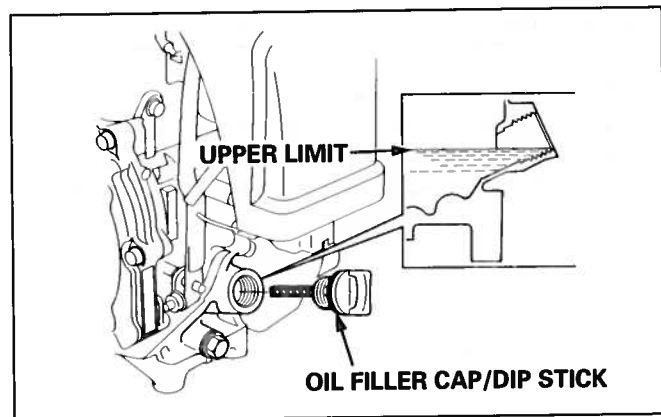
Change the oil if it is stale or contaminated with the foreign material.

Recommended oil	SAE 10W-30 or SAE 30 API Service Classification SH or SJ
-----------------	---

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.

- 4) Install the oil filler cap/dip stick securely.



### Oil Change

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

- 1) Remove the oil filler cap/dip stick and oil drain bolt, and drain the oil into a suitable container.  
Please dispose of the 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.

### CAUTION

Used engine oil contains substances that have been identified as carcinogenic.

If repeatedly left in contact with the skin for prolonged periods, it may cause skin cancer.

Wash your hands thoroughly with soap and water as soon as possible after contact with used engine oil.

- 2) Install a new sealing washer and oil drain bolt and tighten the bolt to the specified torque.

**TORQUE: 11 N·m (1.1 kgf·m, 8.0 lbf·ft)**

- 3) With the engine on a level surface, refill with the recommended fresh engine oil to the specified level.

Engine oil capacity	0.25 l (0.26 US qt, 0.22 Imp qt)
---------------------	----------------------------------

Recommended operating ambient temperature	-15°C – 40°C (23°F – 104°F)
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- 4) Check the oil level again and add to the lower edge of the oil filler neck if necessary.

## 4. AIR CLEANER

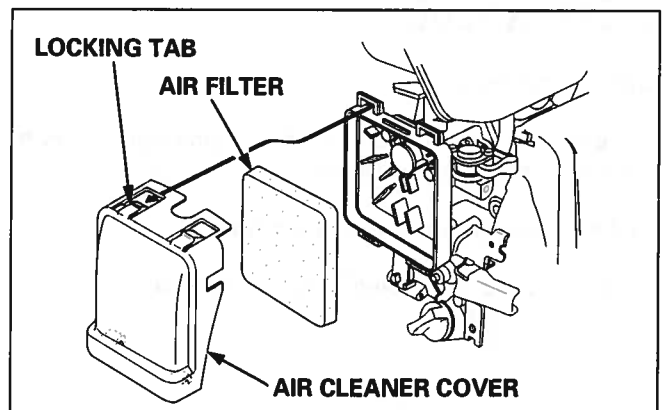
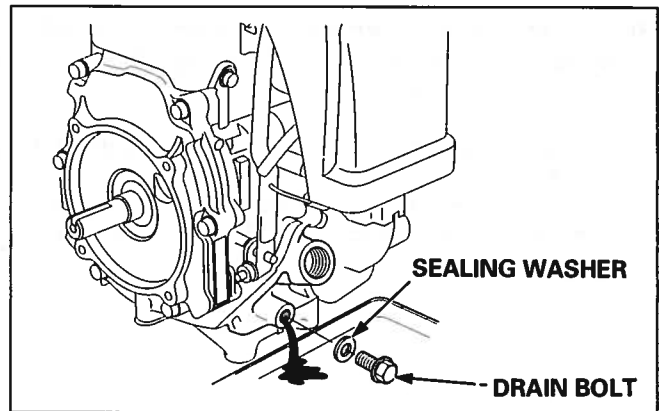
A dirty air filter will restrict air flow to the carburetor, reducing engine performance. If the engine is operated in dusty areas, clean the air filter more often than specified in the MAINTENANCE SCHEDULE.

### 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.

### Cleaning

- 1) Press the locking tabs of the air cleaner cover, and remove the cover and air filter.
- 2) Check the air filter for holes and tears, and replace if necessary.

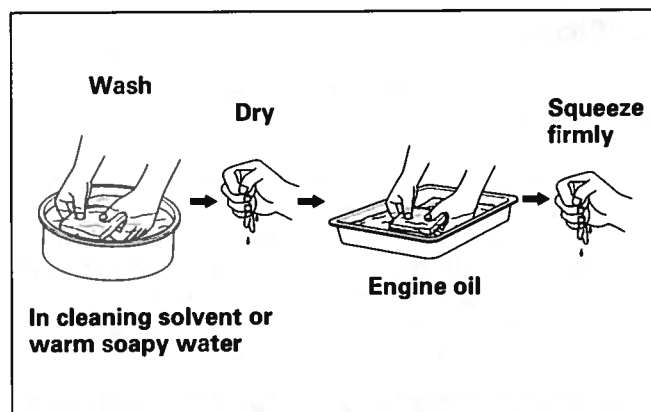




- 3) Clean the air filter in warm soapy water, rinse and allow to dry thoroughly, or clean with a high flash point solvent and allow to dry.

Dip the air filter in clean engine oil and squeeze out all the excess oil.

- Excess oil will restrict air flow through the foam air filter and may cause the engine to smoke when started.

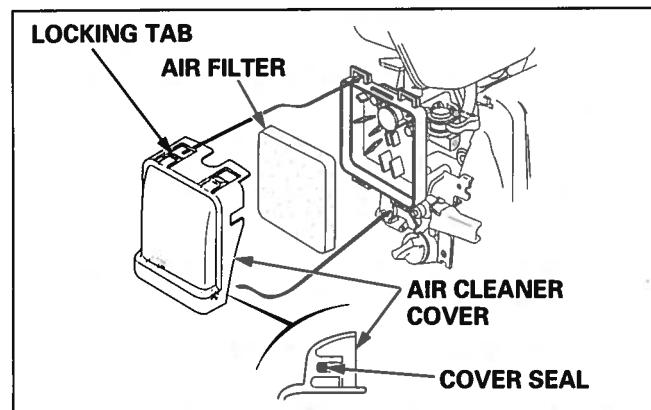


- 4) Install the air filter and air cleaner cover securely.

Make sure that the cover seal is set in the groove of the air cleaner cover properly as shown.

### NOTICE

Loosely installed air cleaner cover can come off by vibration during running.

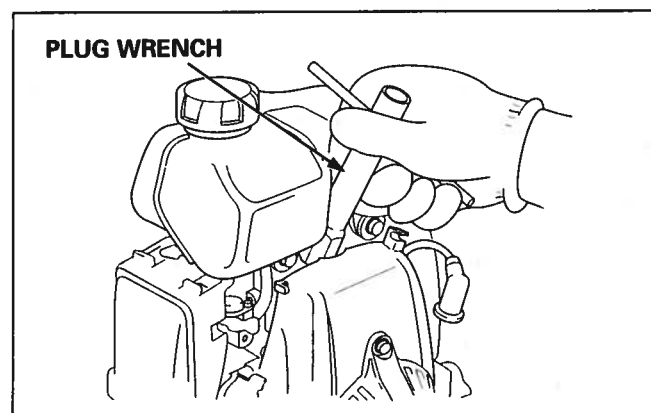


## 5. SPARK PLUG

### Inspection/Cleaning

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

- 1) Clean any dirt from around the spark plug.
- 2) Remove the spark plug cap, and remove the spark plug using a plug wrench.



# HONDA

## GXH50

- 3) Visually inspect the spark plug. Replace the plug if the electrodes are worn, or the insulator is cracked or chipped.
- 4) Remove carbon or other deposits with a stiff wire brush. Check the sealing washer for damage.
- 5) Measure the plug gap with a wire-type feeler gauge. If the measurement is out of the specification, adjust by bending the side electrode.

Spark plug gap	0.6 – 0.7 mm (0.024 – 0.028 in)
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Recommended spark plug	NGK	CR5HSB
	DENSO	U16FSR-UB

- 6) Install the spark plug fingertight to seat the washer, then tighten with a plug wrench.
  - If reinstalling the used spark plug, tighten 1/8 – 1/4 turn after the spark plug seats.
  - If installing a new spark plug, tighten 1/2 turn after the spark plug seats.

### NOTICE

A loose spark plug can become very hot and can damage the engine. Overtightening the spark plug can damage the threads in the cylinder head.

- 7) Install the spark plug cap.

## 6. VALVE CLEARANCE

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

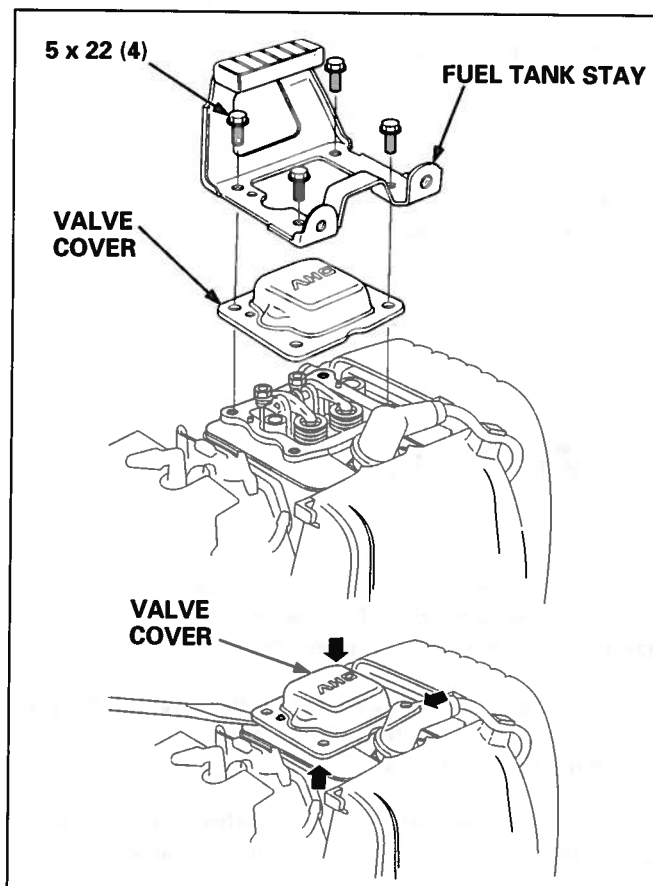
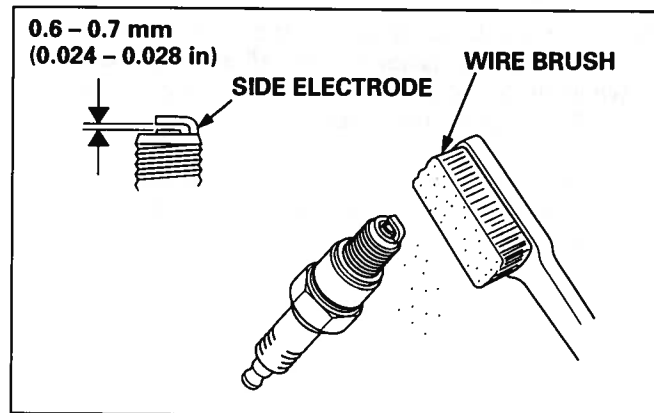
### Check/Adjustment

- 1) Remove the fuel tank (P. 4-1).
- 2) Remove the four 5 x 22 mm flange bolts, and remove the fuel tank stay.
- 3) Loosen the valve cover by slightly prying up each corner, then remove the valve cover.
  - Clean up any spilled engine oil with a shop towel when removing the valve cover.

### NOTICE

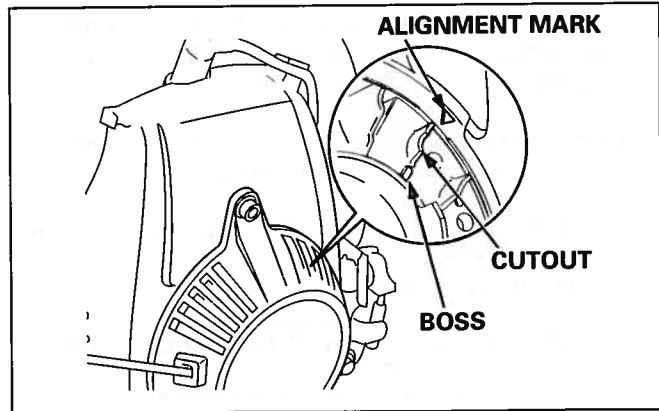
The valve cover can become deformed if removed with excessive force.

- Avoid using excessive force.
- Replace the valve cover if deformed.



4) Pull the recoil starter and set the piston at top dead center of the compression stroke. (Align the cutout in the flywheel fin or the boss on the flywheel with the alignment mark "Δ" on the fan cover.)

- If the exhaust valve opens when the cutout in the flywheel fin is aligned with the alignment mark, turn the recoil starter pulley one turn and align the marks.



5) Insert a feeler gauge between the rocker arm and the valve and measure the valve clearance.

Valve clearance	IN	$0.08 \pm 0.02$ mm
	EX	$0.11 \pm 0.02$ mm

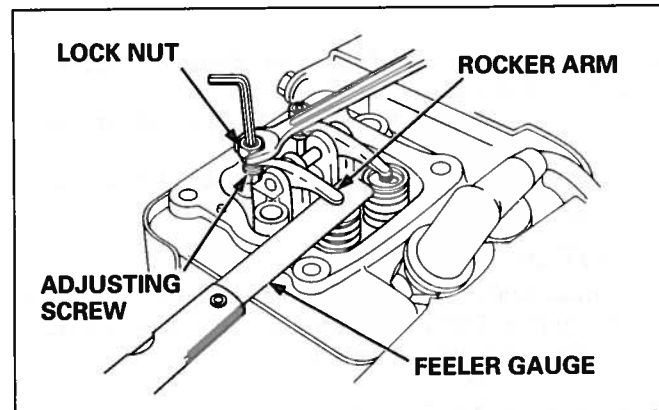
6) If adjustment is necessary, proceed as follows.

- Loosen the lock nut and adjust the valve clearance by turning the adjusting screw in or out.
  - To increase valve clearance, screw out.
  - To decrease valve clearance, screw in.
- Holding the adjusting screw with a wrench, tighten the lock nut to the specified torque.

**TORQUE: 5.4 N·m (0.55 kgf·m, 4.0 lbf·ft)**

- After tightening the lock nut, check the valve clearance again.

7) Reinstall the valve cover (P. 9-2) and other removed parts in the reverse order of removal.



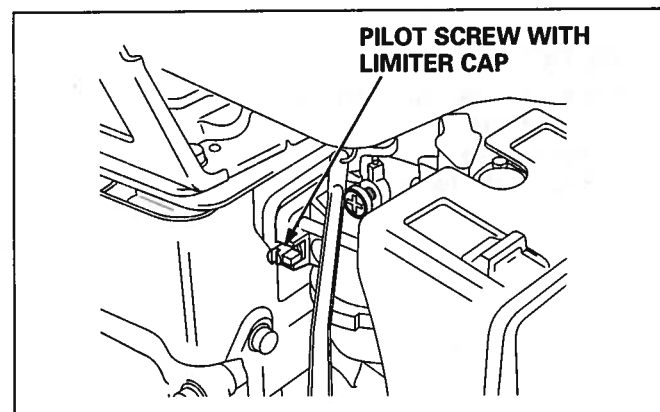
## 7. CARBURETOR

### Pilot Screw

The pilot screw is fitted with a limiter cap that prevents excessive enrichment of the air-fuel mixture in order to comply with emissions regulations.

Do not attempt to remove the limiter cap for pilot screw adjustment. The limiter cap cannot be removed without breaking the pilot screw.

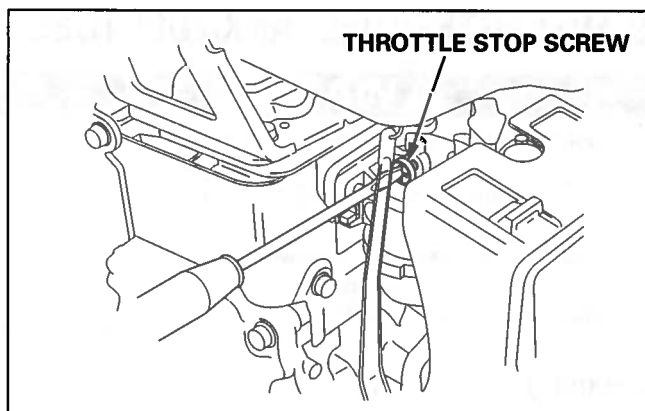
Pilot screw adjustment must be performed only when the carburetor is disassembled and the pilot screw is replaced (P. 5-4).



### Idle Speed Adjustment

- 1) Start the engine and allow it 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	2,500 ± 200 min <sup>-1</sup> (rpm)
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## 8. GOVERNOR

### Adjustment

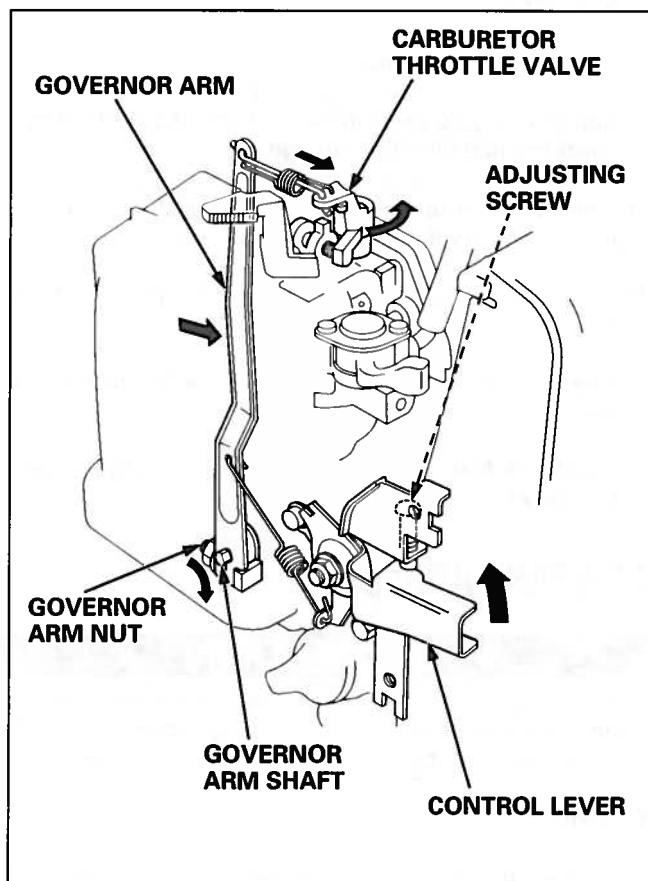
- 1) Remove the fuel tank (P. 4-1).
- 2) Move the control lever to the "HIGH SPEED" position.
- 3) Loosen the governor arm nut on the governor arm.
- 4) Push the governor arm end toward the carburetor side, and open the carburetor throttle valve fully.
- 5) Holding the carburetor throttle valve fully opened, turn the governor arm shaft clockwise fully, and tighten the governor arm nut to the specified torque.

**TORQUE: 6.9 N·m (0.7 kgf·m, 5.1 lbf·ft)**

- 6) Check to see whether the governor arm and the carburetor throttle valve operate smoothly.
- 7) Install the fuel tank (P. 4-1). Start the engine and allow it to warm up to the normal operating temperature. Move the control lever to the maximum engine speed position and check the maximum engine speed.

Maximum engine speed (no load)	7,800 ± 150 min <sup>-1</sup> (rpm)
--------------------------------	-------------------------------------

- 8) Adjust the maximum engine speed, if necessary, by turning the adjusting screw in or out.



### 9. FUEL FILTER/FUEL TANK/FUEL TUBE

#### ⚠ 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.

#### Cleaning

- 1) Drain the fuel in a suitable container and disconnect the fuel tank tube.
- 2) Remove the fuel filter.
- 3) Remove any foreign material from the fuel filter, and check the fuel filter for damage.
- 4) Clean the fuel tank with cleaning solvent and allow the fuel tank to dry thoroughly.
- 5) Check the fuel tube for deterioration, cracks or signs of leakage.
- 6) After cleaning, set the fuel filter in the fuel tank and connect the fuel tank tube.
- 7) Install the fuel tank and check for fuel leakage from the fuel tank tube.

### 10. SPARK ARRESTER

#### ⚠ CAUTION

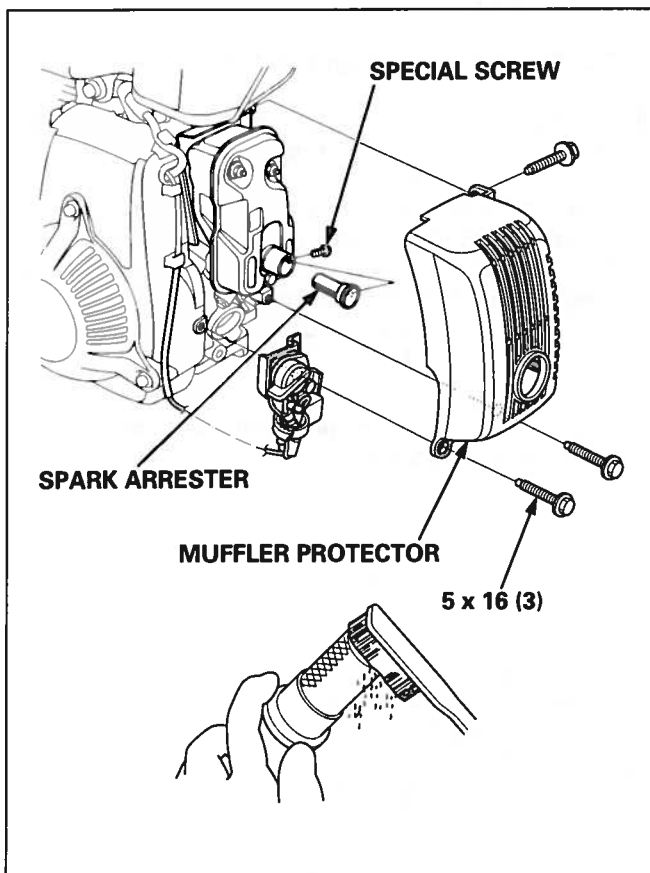
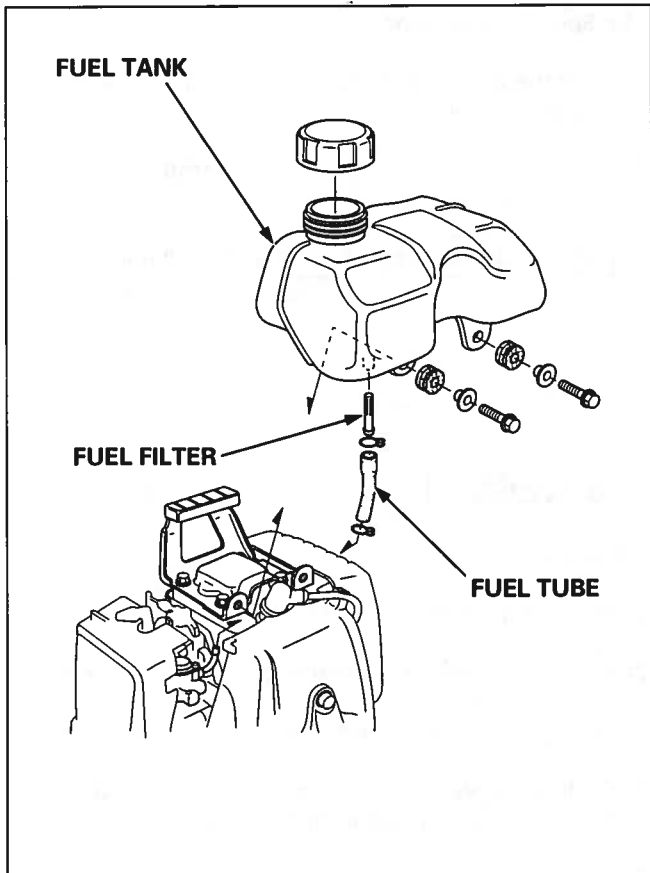
The engine and muffler become very hot during operation and they remain hot for a while after operation. Be sure that the engine is cool before muffler removal/ installation.

#### Cleaning

- 1) Remove the three 5 x 16 mm flange bolts and the muffler protector.
- 2) Remove the special screw and spark arrester.
- 3) 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.

- 4) Reinstall the removed parts in the reverse order of removal.



**1. FUEL TANK**

**1. FUEL TANK**

**a. REMOVAL/INSTALLATION**

**⚠ 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.
- Drain the fuel tank thoroughly before removal.

**FUEL TANK**

**INSTALLATION:**

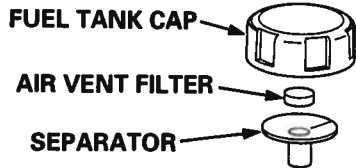
Clean the tank to remove foreign material and water in the tank before installation.

Tank capacity: 0.77ℓ (0.20 US gal)

**FUEL TANK CAP**

**INSTALLATION:**

When the air vent filter is contaminated, clean with warm soapy water. Allow the filter to dry thoroughly before installation.



**FUEL TANK MOUNT RUBBER B**

**FUEL TANK STAY**

REMOVAL/INSTALLATION: P. 9-1

**FUEL FILTER**

**INSTALLATION:**

Clean by blowing with compressed air. Check the filter for blockage and damage, and install the filter.

**TUBE CLIP (B12)**

**FUEL TUBE**

**INSTALLATION:**

Check for deterioration, cracks and gasoline leakage. Replace if necessary.

**TUBE CLIP (B8)**

**FUEL TANK MOUNT RUBBER A (2)**

**SETTING COLLAR (2)**

**6 x 20 mm BOLT-WASHER (2)**

10 N·m  
(1.0 kgf·m, 7 lbf·ft)

NEW

- 1. AIR CLEANER
- 2. CARBURETOR

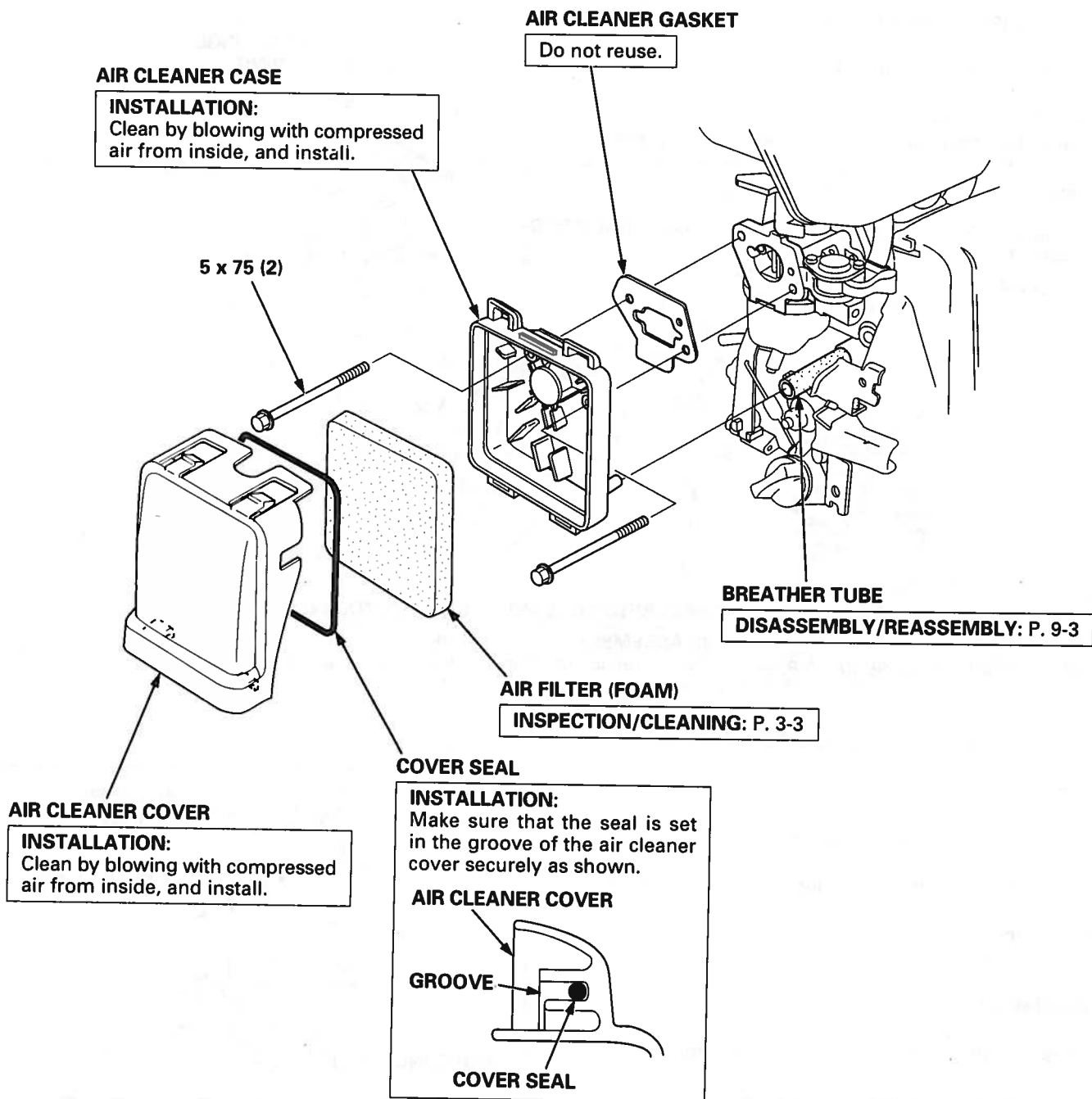
- 3. CONTROL BASE/GOVERNOR ARM

## 1. AIR CLEANER

### a. REMOVAL/INSTALLATION

#### NOTICE

If the air cleaner removal/installation is made with the carburetor installed, hand tighten the 5 x 75 mm flange bolts. Turn the choke lever to the fully closed position to prevent dust and dirt from entering the engine.



## 2. CARBURETOR

### a. REMOVAL/INSTALLATION

#### ⚠ 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.
- Loosen the drain screw to drain the carburetor thoroughly before removal.

- 1) Remove the fuel tank (P. 4-1).
- 2) Remove the air cleaner (P. 5-1).

#### NOTICE

Cover the intake port with clean tape or film to prevent dirt from entering into the engine. If left uncovered, dirt will enter the intake system, damaging the engine.

#### CARBURETOR INSULATOR GASKET

**REASSEMBLY:**  
Do not reuse. Install in the direction shown.

#### GOVERNOR ROD

#### ANTISURGE SPRING

#### CARBURETOR

**DISASSEMBLY/REASSEMBLY:** P. 5-3

#### CARBURETOR GASKET

**REASSEMBLY:**  
Do not reuse. Install in the direction shown.

#### CARBURETOR INSULATOR

**REASSEMBLY:**  
Install in the direction shown.

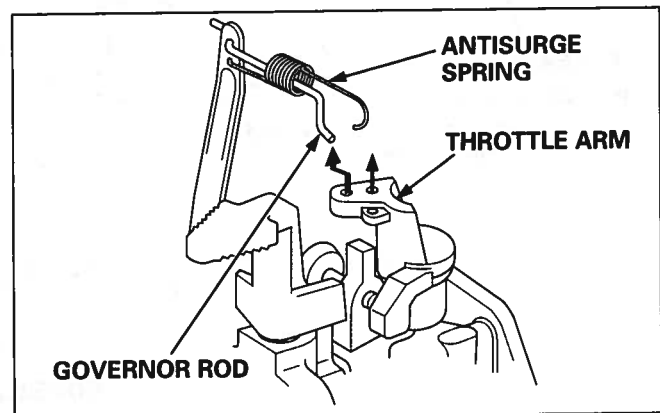
### • GOVERNOR ROD/ANTISURGE SPRING

#### Removal

- 1) Remove the air cleaner cover (P. 5-1).
- 2) Disconnect the antisurge spring from the throttle arm.
- 3) Twist the carburetor and remove the governor rod from the throttle arm.

#### Installation:

- 1) First, install the governor rod on the throttle arm.
- 2) Hook the antisurge spring on the throttle arm.





### b. CARBURETOR DISASSEMBLY/REASSEMBLY

#### ⚠ WARNING

Gasoline is highly flammable and explosive.

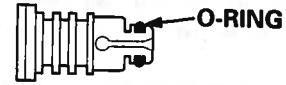
You can be burned or seriously injured when handling fuel.

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

#### PILOT JET

##### REASSEMBLY:

- Clean the passage by blowing with compressed air before installation.
- Apply light coat of oil to the O-ring to facilitate installation.



#### LIMITER CAP

INSTALLATION: P. 5-4

#### PILOT SCREW

REPLACEMENT: P. 5-4

#### THROTTLE STOP SCREW

ADJUSTMENT: P. 3-7

#### CARBURETOR BODY

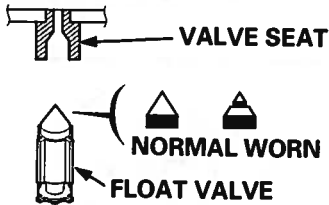
##### REASSEMBLY:

Clean the body by blowing with compressed air before installation.

#### FLOAT VALVE

##### REASSEMBLY:

Check the float valve tip for wear and check the spring for operation.



#### O-RING

3 x 6 mm SCREW

LEVER SETTING PLATE

LEVER SPRING

FUEL VALVE LEVER

FUEL VALVE GASKET

##### REASSEMBLY:

Check the gasket for wear and damage before installation.

#### MAIN NOZZLE

##### REASSEMBLY:

Clean the passage by blowing with compressed air before installation.

MAIN NOZZLE

#### FLOAT

##### REASSEMBLY:

After installation, check for operation by lightly pushing with a finger.

INSPECTION: P. 5-4

FLOAT PIN

#### FLOAT CHAMBER

##### REASSEMBLY:

Install with the drain screw facing to the air cleaner side.

DRAIN TUBE

SEALING WASHER

DRAIN BOLT

4.4 N·m (0.45 kgf·m, 3.3 lbf·ft)

DRAIN SCREW

1.5 N·m (0.15 kgf·m, 1.1 lbf·ft)

FLOAT CHAMBER GASKET

SEALING WASHER

SET BOLT

##### REASSEMBLY:

Tighten the bolt securely and check for gasoline leakage.

#### MAIN JET

##### REASSEMBLY:

Clean the passage by blowing with compressed air before installation.

Main jet: #55

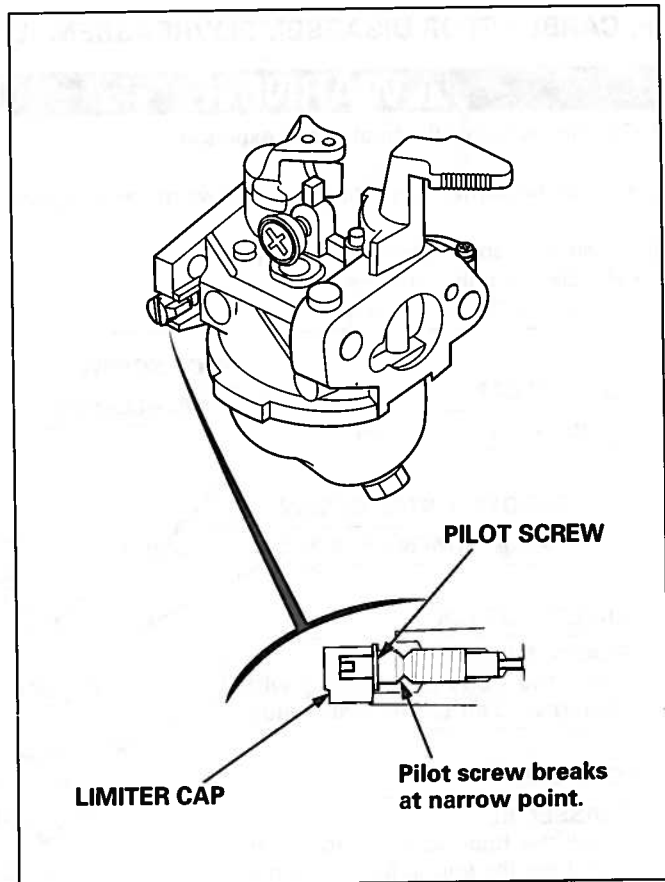
MAIN JET

### • PILOT SCREW AND LIMITER CAP REPLACEMENT

Leave the pilot screw and limiter cap in place during carburetor cleaning. Remove only if necessary for carburetor repair. Removal of the limiter cap requires breaking the pilot screw. A new pilot screw and limiter cap must be installed.

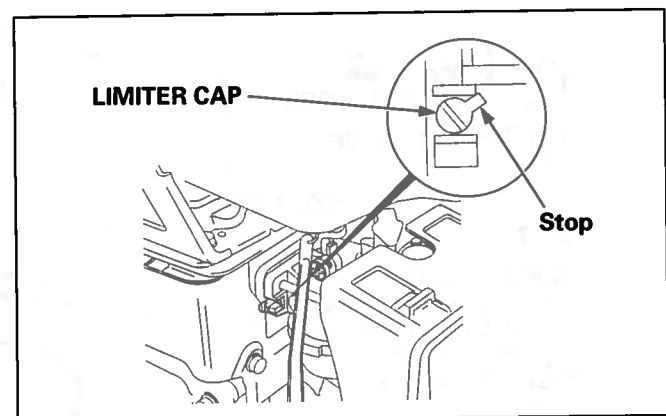
- 1) When the limiter cap has been broken off, remove the broken pilot screw from the carburetor body.
- 2) Place the spring on the replacement pilot screw, and install it on the carburetor.
- 3) Turn the pilot screw in until it is lightly seated, then turn the screw out the required number of turns.

Standard pilot screw opening	1 1/8 turns out
------------------------------	-----------------



- 4) Apply LOCTITE® 638 to the inside of the new limiter cap, then install the cap so its stop prevents the pilot screw from being turned counterclockwise.

Be careful to avoid turning the pilot screw while installing the limiter cap. The pilot screw must stay at its required setting position.



### c. INSPECTION

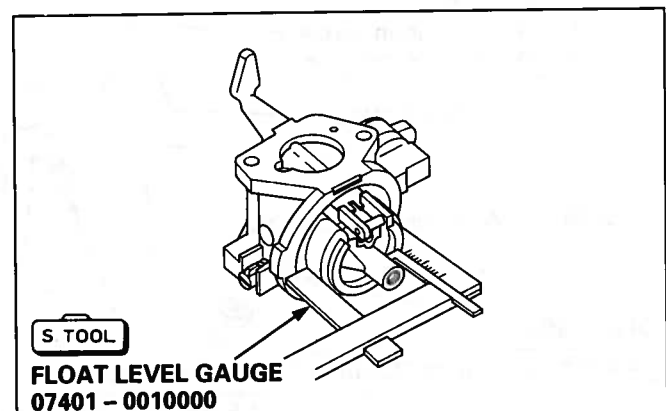
#### • FLOAT LEVEL HEIGHT

Place the carburetor in the position shown, and push in the float with a finger.

Measure the distance (float height) between the float top and carburetor body when the leg of the float just starts to push the float valve.

Standard float height	12.0 mm (0.47 in)
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If the float height is out of the specification, replace the float.



### 3. CONTROL BASE/GOVERNOR ARM

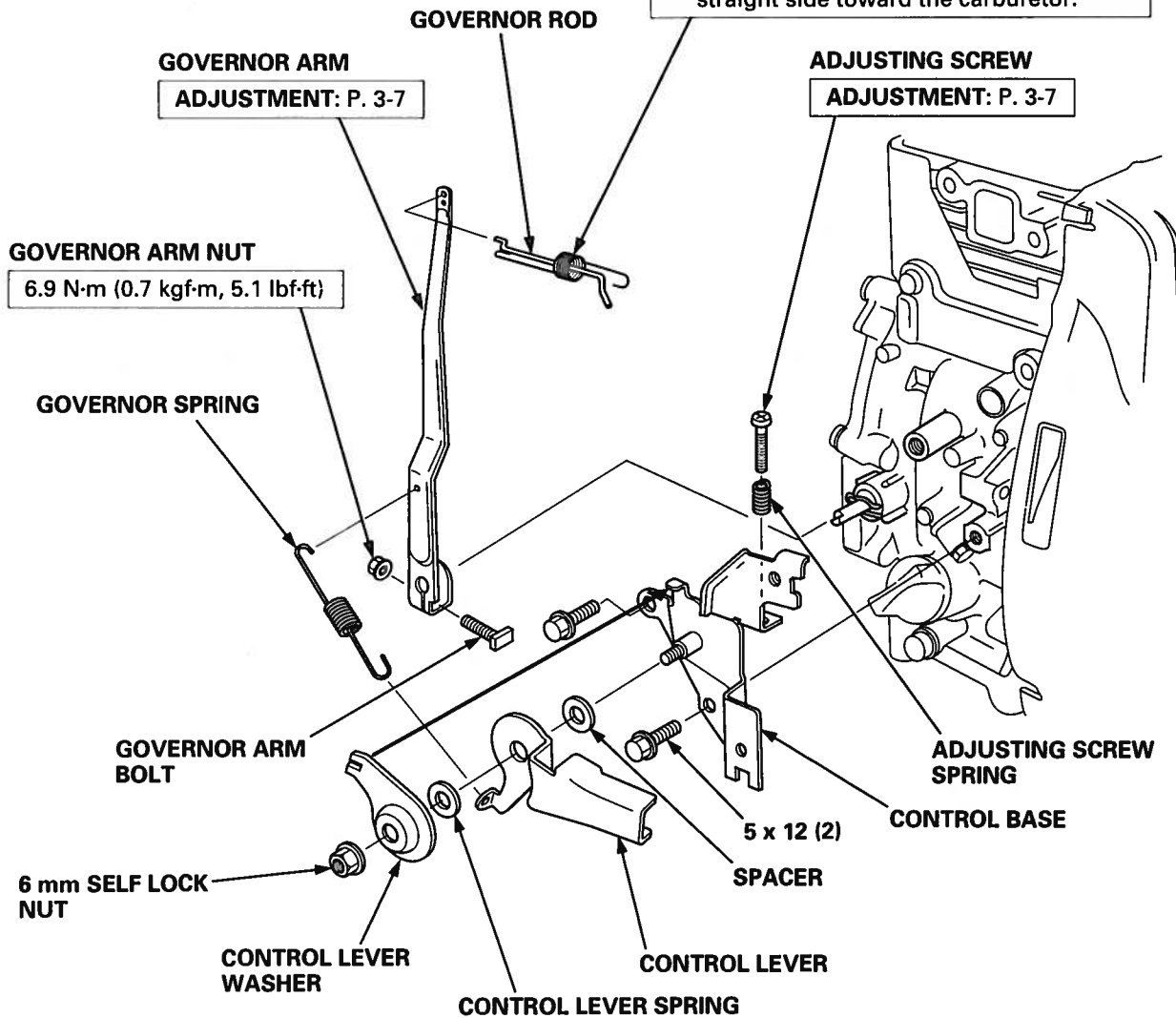
#### a. DISASSEMBLY/REASSEMBLY

- 1) Remove the air clearer (P. 5-1).
- 2) Remove the carburetor (P. 5-2).

#### ANTISURGE SPRING

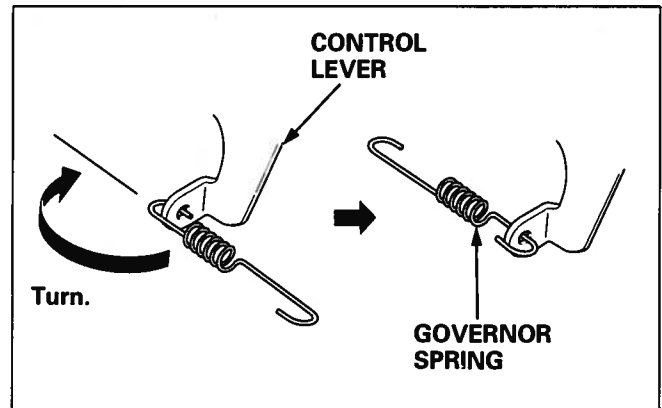
##### INSTALLATION:

- Hook the spring ends at the smaller holes in the governor arm and the throttle lever.
- Install the spring with the shorter straight side toward the carburetor.



#### • GOVERNOR SPRING INSTALLATION

- 1) Set the hook on the governor spring end of the shorter straight side in the hole on the control lever as shown (Left).
- 2) Then, turn the spring direction to install it as shown (Right).
- 3) Hook the governor spring end hook of the longer straight side at the hole on the governor arm.



## 1. MUFFLER

### 1. MUFFLER

#### a. REMOVAL/INSTALLATION

#### ⚠ CAUTION

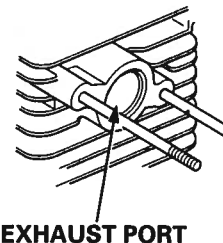
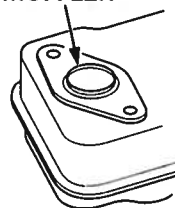
The engine and muffler become very hot during operation and they remain hot for a while after operation. Be sure that the muffler removal/installation must be made while the engine is cold.

#### MUFFLER

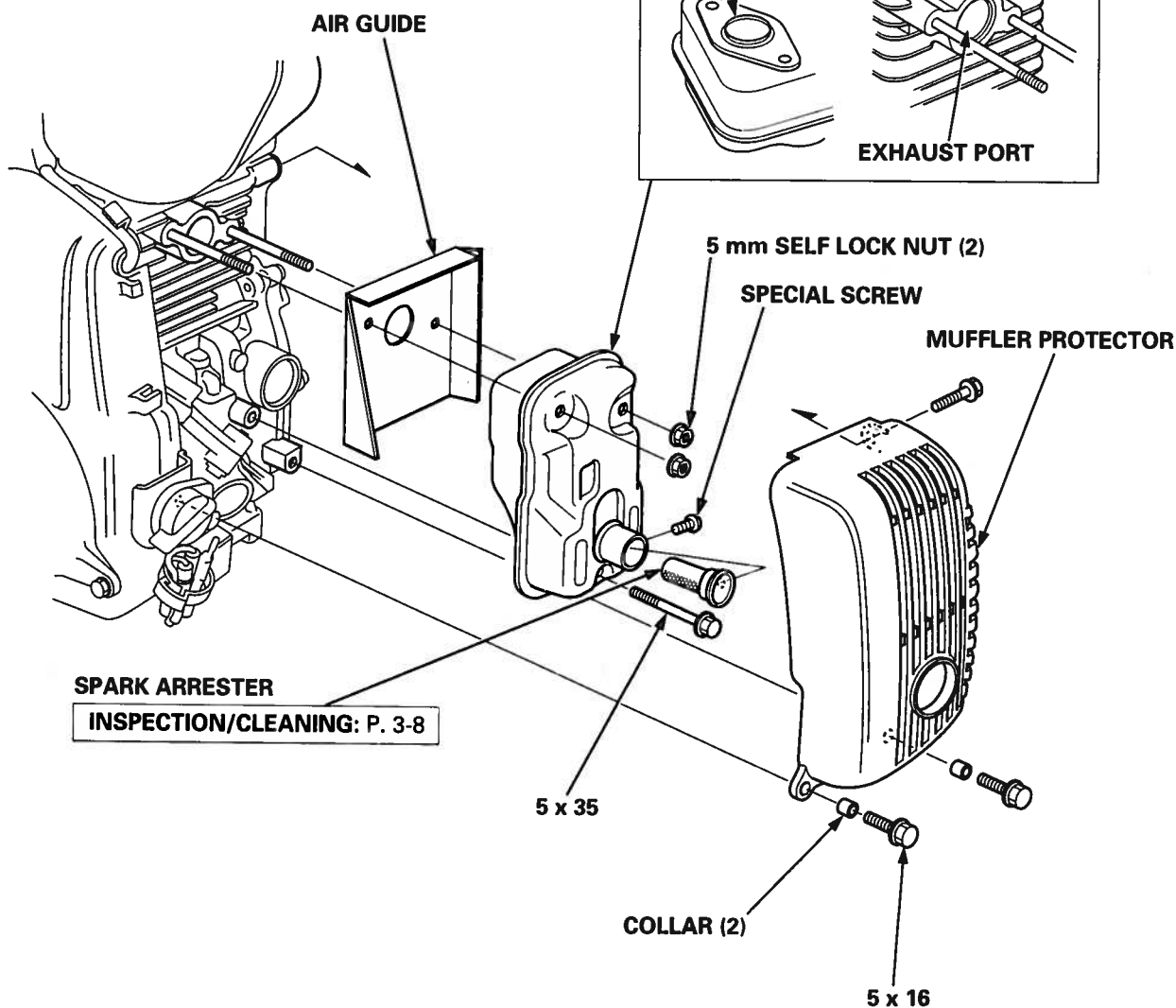
##### INSTALLATION:

- Remove carbon deposits by tapping lightly with a plastic hammer before installation.
- Do not tap on the seal flange of the muffler and take care not to damage the seal flange during installation. If the seal flange has dents or damage, replace the muffler.
- Check the exhaust port for damage.

##### SEAL FLANGE OF MUFFLER



EXHAUST PORT

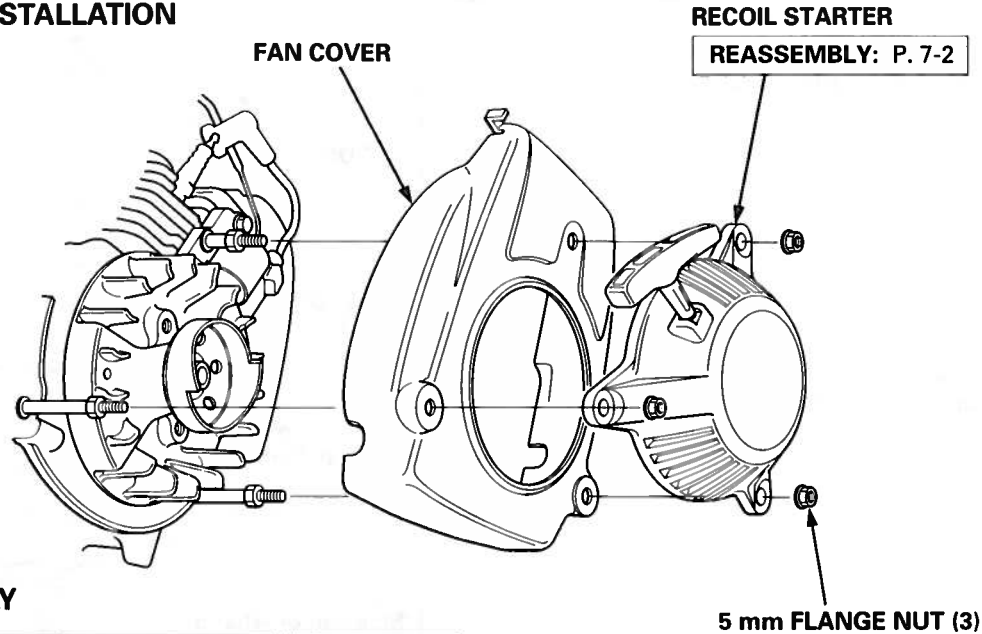


**1. RECOIL STARTER/FAN COVER**

**2. ENGINE STOP SWITCH/OIL ALERT ESS**

**1. RECOIL STARTER/FAN COVER**

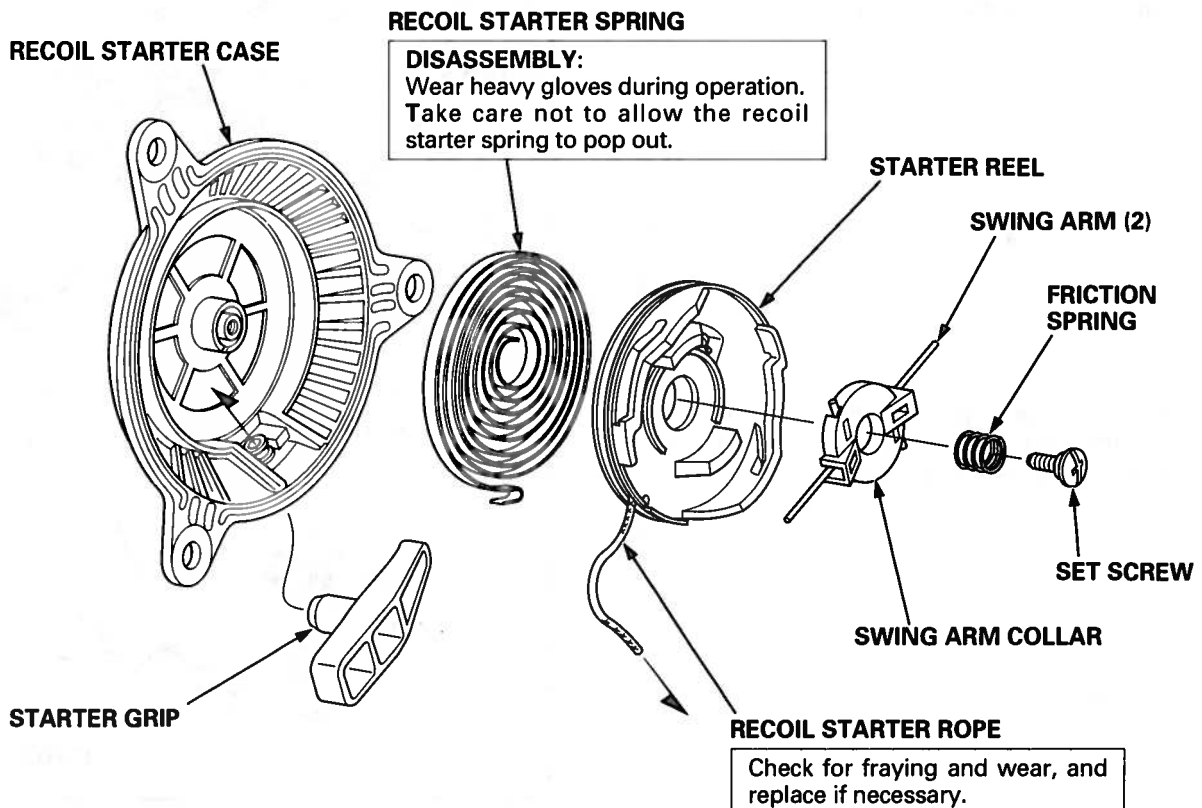
**a. REMOVAL/INSTALLATION**



**b. DISASSEMBLY**

**CAUTION**

- Wear heavy gloves during operation.
- Take care not to allow the recoil starter spring to pop out.

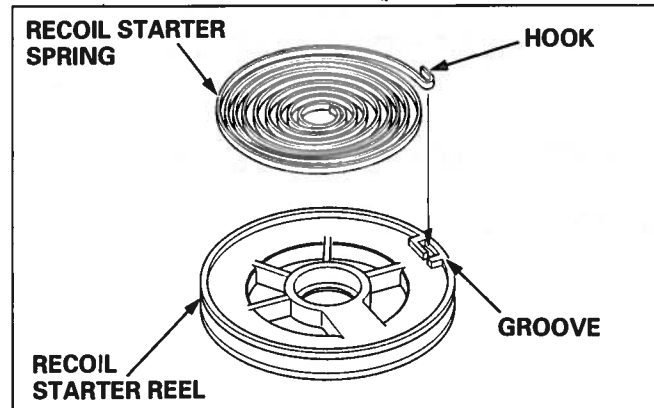


### c. REASSEMBLY

#### ⚠ CAUTION

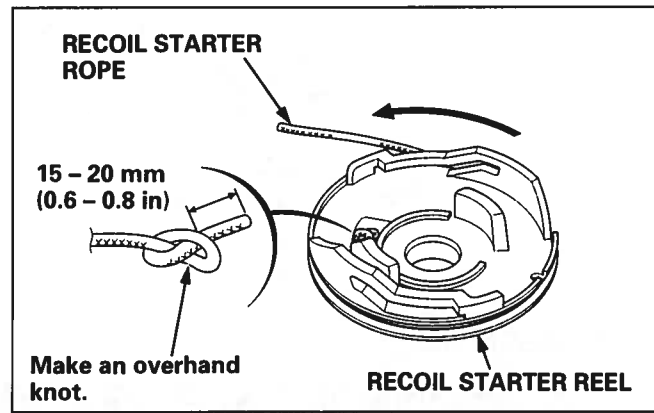
- Wear heavy gloves during operation.
- Take care not to allow the recoil starter spring to pop out.

1) Set the hook on the outer end of the recoil starter spring in the groove on the starter reel.

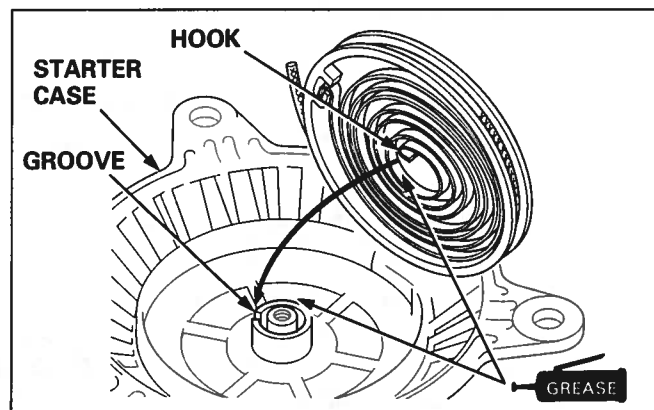


2) Pass the starter rope through the rope hole in the reel and make an overhand knot at the rope end.

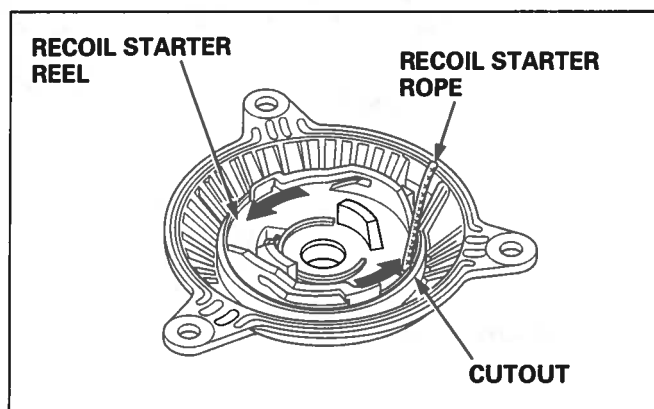
Wind the rope around the recoil starter reel in the direction of the arrow.



3) Align the hook on the inner end of the recoil starter spring with the groove in the case so that the hook sets in the groove, and install the reel into the case.



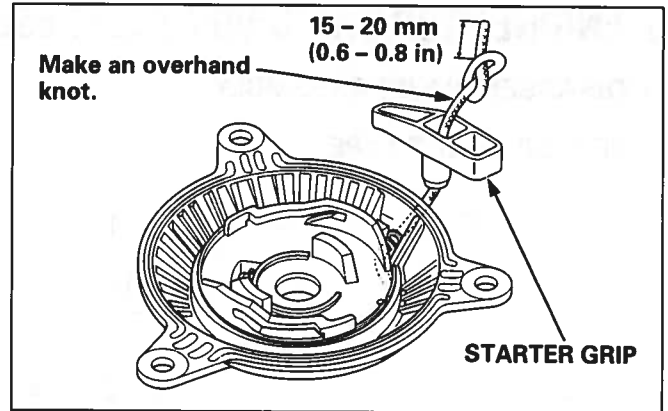
4) Pass the starter rope through the cutout on the starter reel and turn the starter reel approximately 3 turns in the direction of the arrows to preload the spring.



# HONDA

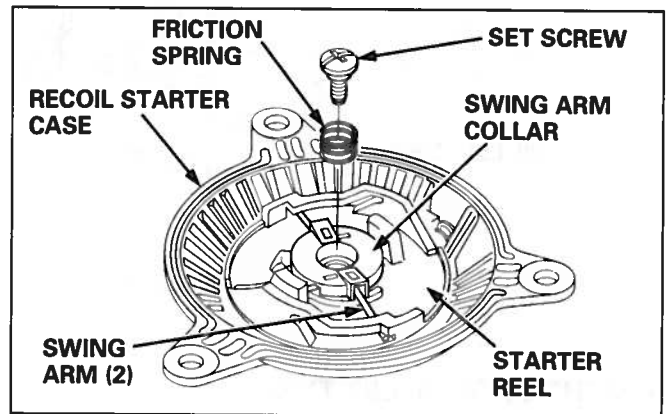
## GXH50

- 5) Pull the rope end out through the hole in the case. Pass the rope end through the starter grip and make an overhand knot at the rope end.



- 6) Install the swing arm, swing arm collar and friction spring as shown, and secure the starter reel to the recoil starter case with the set screw.

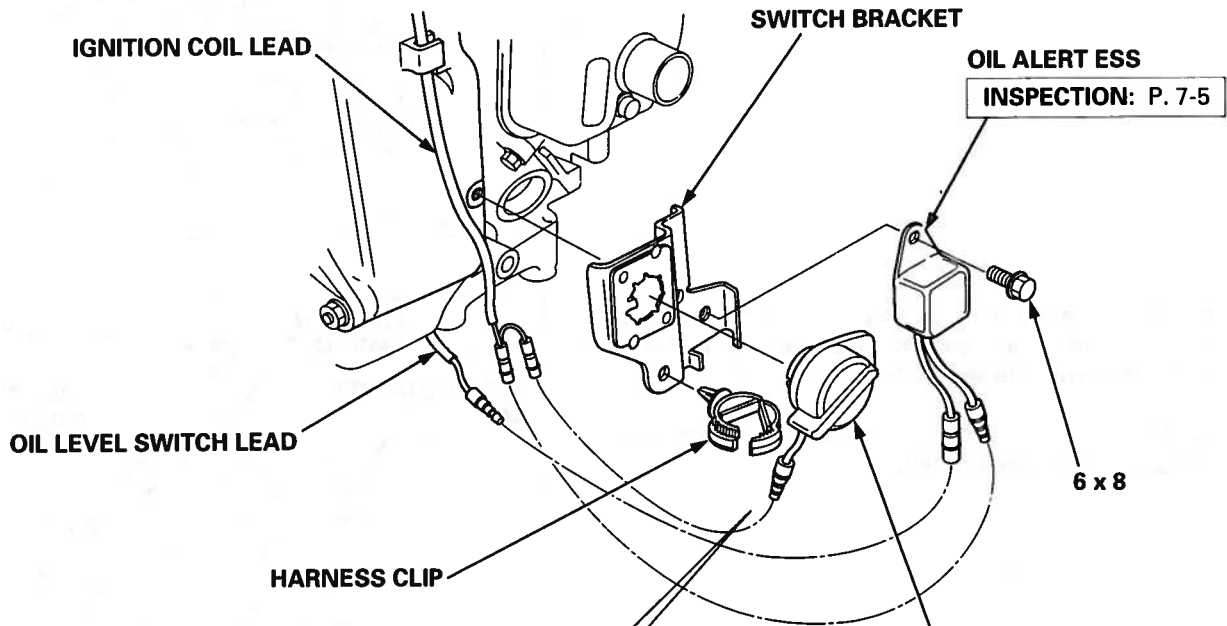
Pull the starter grip several times and be sure that the swing arm operates normally.



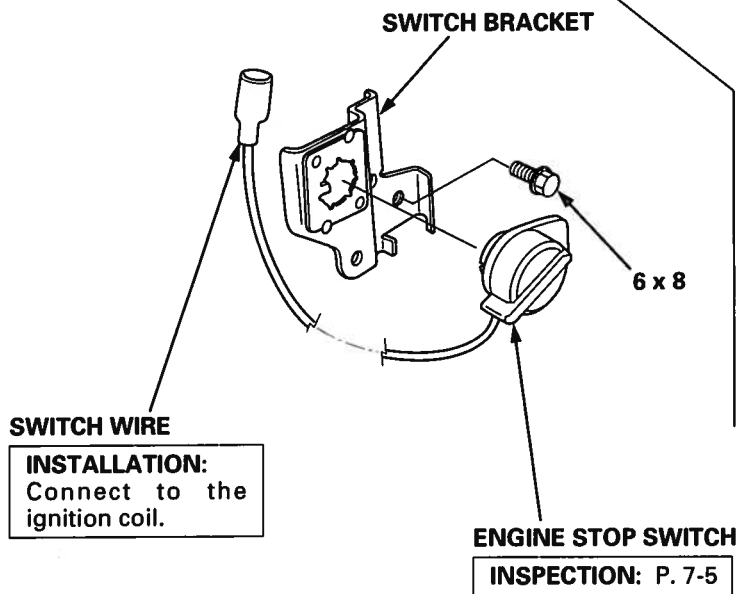
## 2. ENGINE STOP SWITCH/OIL ALERT ESS (ENGINE STOP SWITCH)

### a. DISASSEMBLY/REASSEMBLY

#### • WITH OIL ALERT TYPE



#### • WITHOUT OIL ALERT TYPE





### b. INSPECTION

#### • OIL ALERT ESS (ENGINE STOP SWITCH)

Measure the resistance between the black and yellow leads, and between each of the black and yellow leads and the oil alert ESS body.

If the measurement is out of the specifications shown in the chart below, replace the oil alert ESS.

(+) tester probe	Black	Yellow	Body
(-) tester probe			
Black		500 - 10 k $\Omega$	$\infty$
Yellow	500 - 10 k $\Omega$		$\infty$
Body	$\infty$	$\infty$	

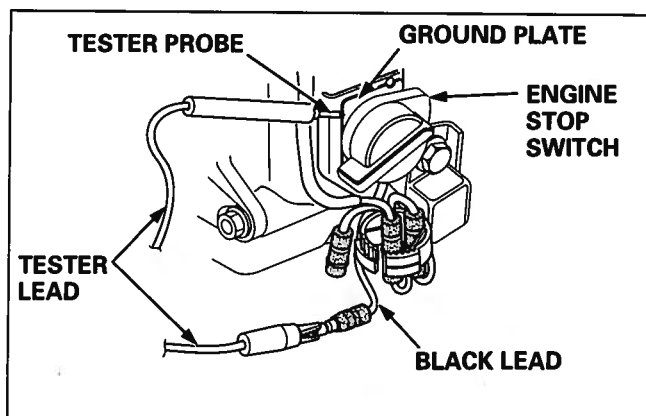
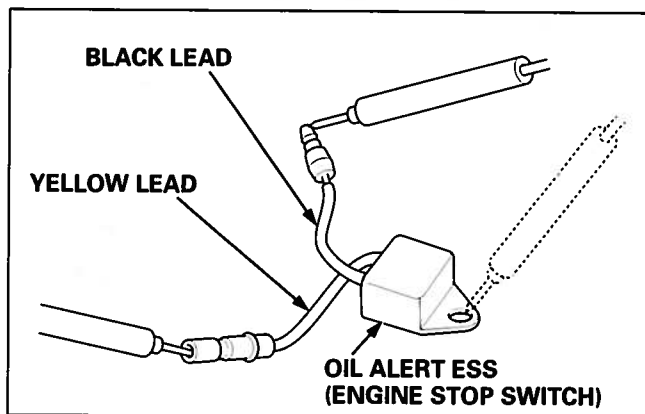
- Take care not to touch the tester probe during inspection. Human body resistance is indicated when you touch the metallic part of the tester probe.
- Be sure to use the recommended tester listed below. Incorrect resistance will be shown by the use of an unrecommended tester.
- When an abnormal resistance is shown, check the tester battery. Correct resistance cannot be obtained by the use of undercharged battery.  
Recommended tester: 20 k $\Omega$ /VDC, 9 k $\Omega$ /VAC (Impedance)

#### • ENGINE STOP SWITCH

Attach the tester leads to the black lead and the ground plate of the engine stop switch, and check for continuity.

Switch OFF: There should be continuity.

Switch ON: There should not be continuity.



## 1. FLYWHEEL/IGNITION COIL

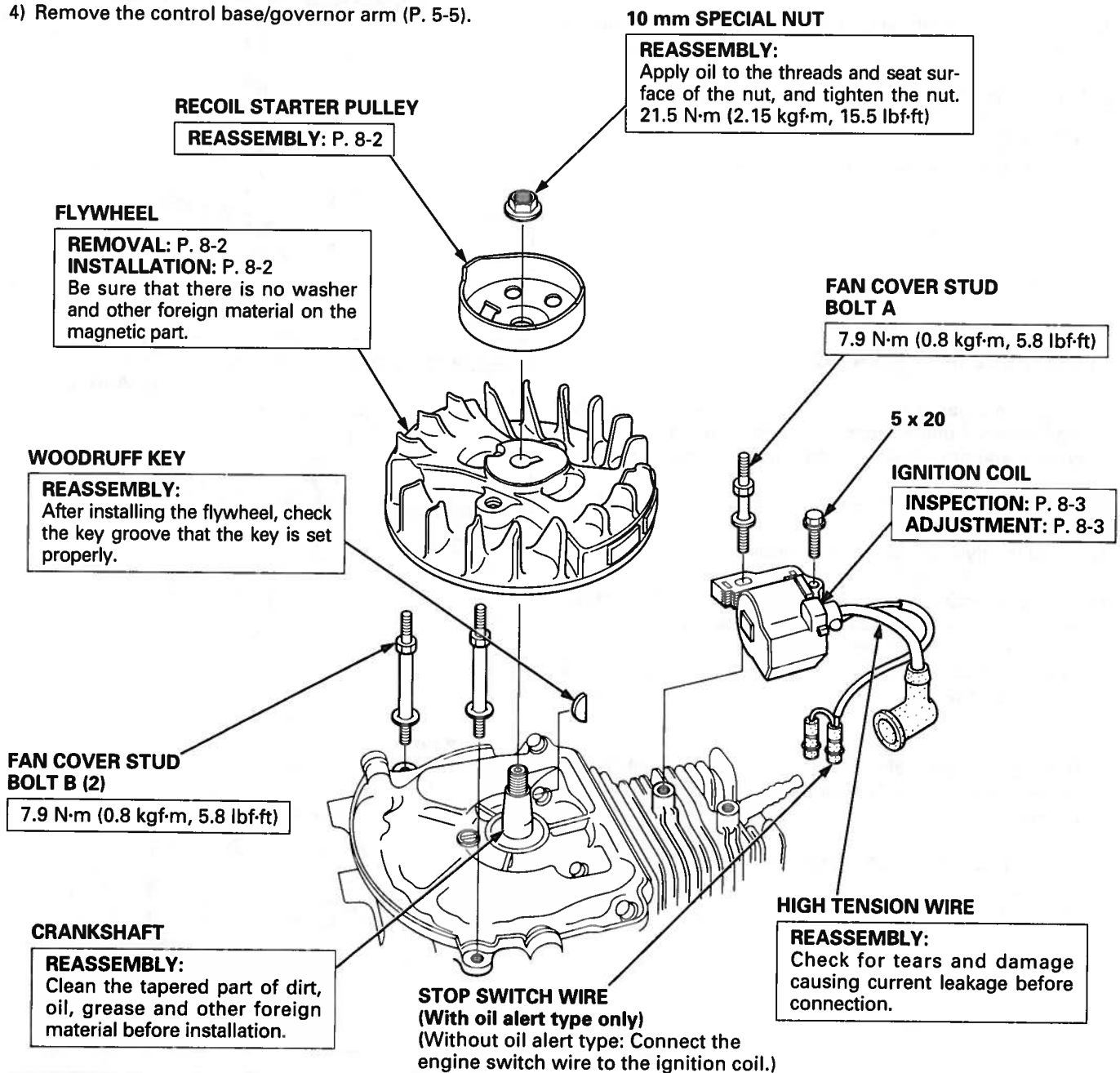
### 1. FLYWHEEL/IGNITION COIL

#### a. DISASSEMBLY/REASSEMBLY

##### NOTICE

Take care not to damage the fan blades during removal and installation of the flywheel.

- 1) Remove the air cleaner/carburetor (P. 5-1 and 2).
- 2) Disconnect the engine stop switch lead connectors and the oil alert ESS lead connectors, and remove the parts together with the stop switch bracket (P. 7-4).
- 3) Remove the recoil starter/fan cover (P. 7-1).
- 4) Remove the control base/governor arm (P. 5-5).



### • FLYWHEEL REMOVAL

- 1) Remove the ignition coil.
- 2) Holding the flywheel with a commercially available strap wrench, remove the 10 mm special nut.

#### **NOTICE**

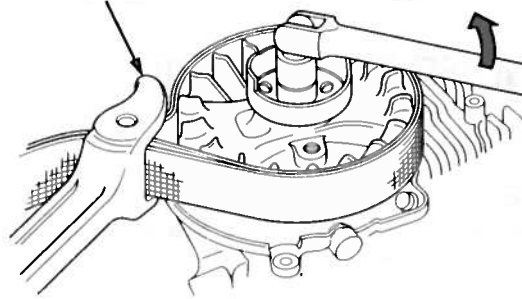
Do not loosen the nut holding the flywheel by setting a screw driver equivalent tool on the fan blade or projection.

- 3) Remove the recoil starter pulley.
- 4) Set a commercially available flywheel puller on the flywheel.
- 5) Screw in the flywheel puller and remove the flywheel.

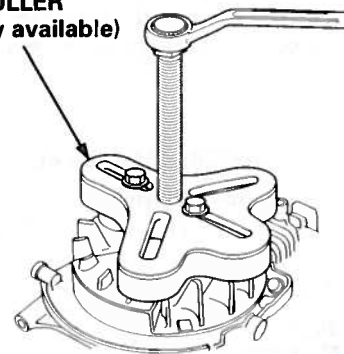
#### **NOTICE**

Do not hit the flywheel with a hammer.

**STRAP WRENCH**  
(Commercially available)



**FLYWHEEL PULLER**  
(Commercially available)

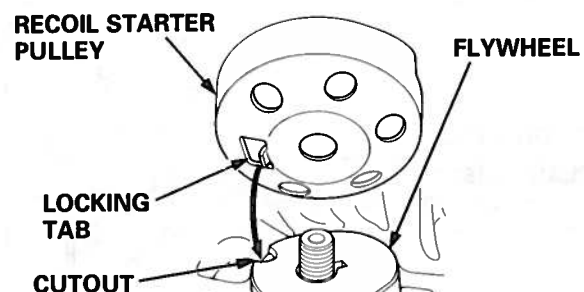


### • FLYWHEEL INSTALLATION

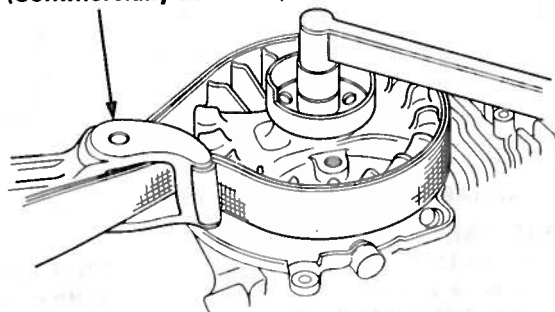
- 1) Clean the tapered part of dirt, oil, grease and other foreign material before installation. Be sure that there is no washer and other foreign material on the magnetic part.
- 2) Set the woodruff key in the key groove securely (P. 8-1).
- 3) Install the flywheel over the crankshaft.
- 4) Align the locking tab on the recoil starter pulley with the cutout in the flywheel, and install the pulley.
- 5) Apply light coat of the oil to the threads and the seating surface of the 10 mm special nut, and install the nut loosely.
- 6) Holding the flywheel with a commercially available strap wrench, tighten the 10 mm special nut to the specified torque.

**TORQUE: 21.5 N·m (2.15 kgf-m, 15.5 lbf-ft)**

- 7) Install the ignition coil and adjust the air gap (P. 8-3).



**STRAP WRENCH**  
(Commercially available)



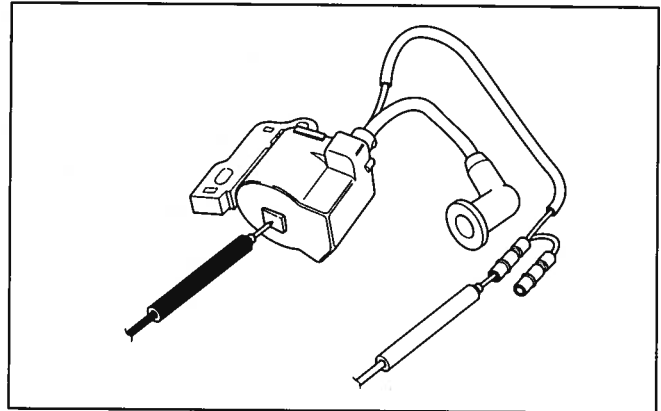
### b. INSPECTION

#### • IGNITION COIL

##### <Primary resistance>

Attach one lead of the tester to the lead terminal and another tester lead to the iron core, and measure the primary resistance of the ignition coil.

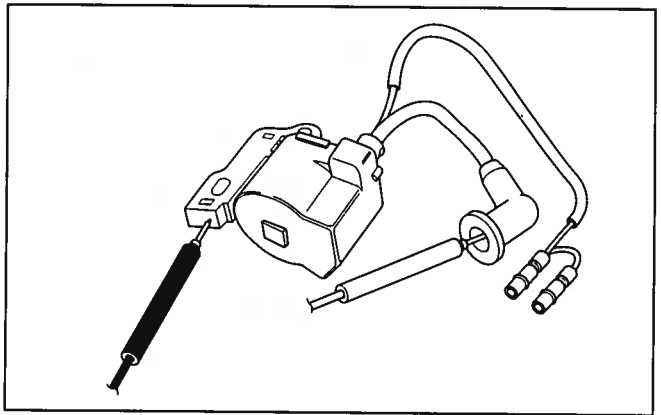
Resistance	0.98 – 1.20 $\Omega$
------------	----------------------



##### <Secondary resistance>

Attach one lead of the tester to the terminal inside the spark plug cap and another lead to the iron core, and measure the secondary resistance of the ignition coil.

Resistance	8.0 – 10.0 k $\Omega$
------------	-----------------------

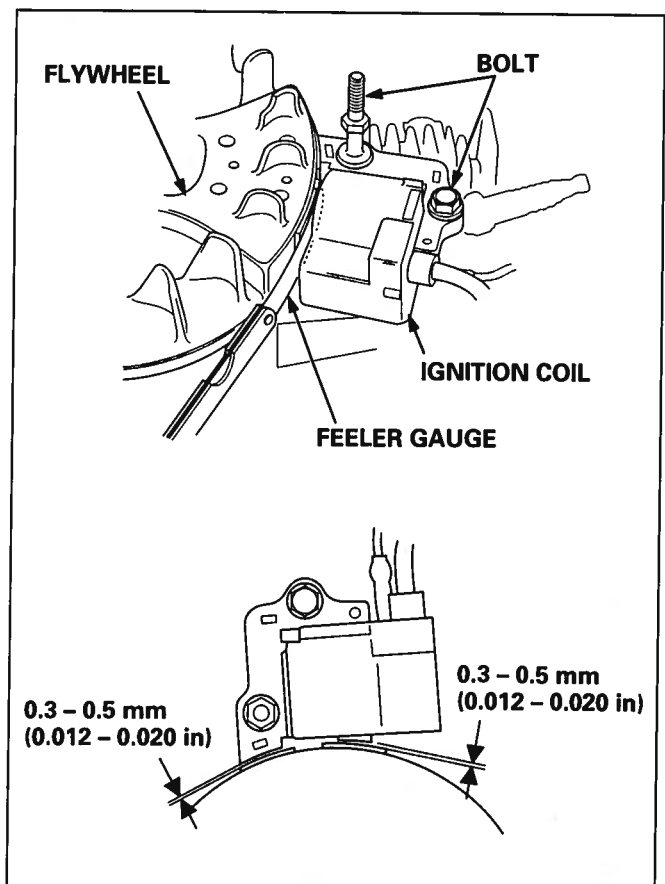


### c. ADJUSTMENT

#### • IGNITION COIL AIR GAP

- 1) Loosen the two ignition coil bolts.
- 2) Insert a feeler gauge of the proper thickness between the ignition coil and the flywheel.
  - Adjust the air gap at the magnetic part of the flywheel.
  - To bring the air gap at both ends of the ignition coil equal, set the feeler gauge along the circumference of the unit and adjust the clearance at both ends simultaneously.
- 3) Pushing the ignition coil against the flywheel, tighten the two bolts and adjust the air gap.

Air gap	0.3 – 0.5 mm (0.012 – 0.020 in)
---------	---------------------------------



1. ROCKER ARMS/PUSH RODS	3. CAM/VALVE LIFTERS
2. CRANKCASE SIDE COVER	4. INSPECTION

**1. ROCKER ARMS/PUSH RODS**

**a. DISASSEMBLY/REASSEMBLY**

5 x 22 (4)

**REASSEMBLY:**  
Tighten the bolts in a crisscross pattern in 2 or 3 steps.  
5.9 N·m (0.6 kgf·m, 4.3 lbf·ft)

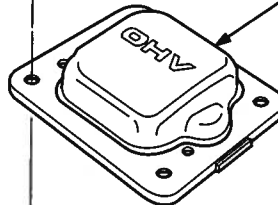
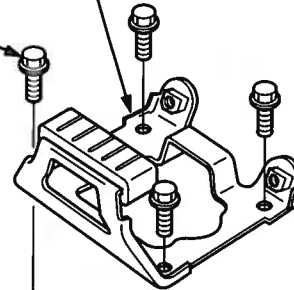
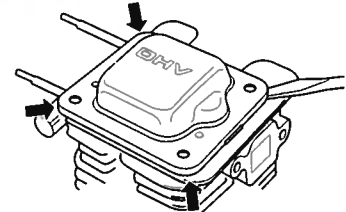
FUEL TANK STAY

**VALVE COVER**

**DISASSEMBLY:**

- When removing the valve cover, pry off slowly at each corner of the valve cover.
  - Do not remove the valve cover with force. It can deform the valve cover.
- Replace the valve cover if it is deformed.

**INSTALLATION:** P. 9-2



LOCK NUT (2)

ROCKER ARM (2)

INSPECTION: P. 9-7

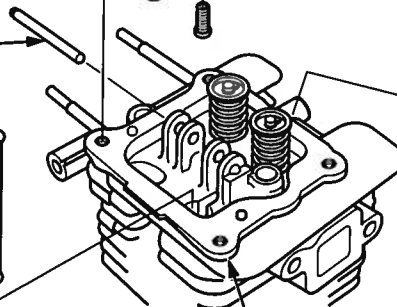
VALVE ADJUSTMENT SCREW (2)

INSPECTION/ADJUSTMENT: P. 3-5



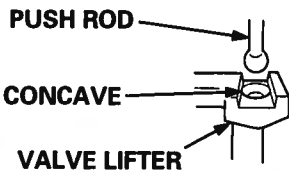
ROCKER ARM SHAFT

INSPECTION: P. 9-8



PUSH ROD (2)

**REASSEMBLY:**  
Check for wear and bend at both ends of the push rod. Install by aligning with the adjustment screw and the concave in the valve lifter securely.



SPARK PLUG

**INSPECTION:** P. 3-5  
STANDARD SPARK PLUG:  
CR5HSB) (NGK)  
U16FSR-UB (DENSO)  
12 N·m (1.2 kgf·m, 8.7 lbf·ft)

CYLINDER BLOCK

INSPECTION: P. 9-8

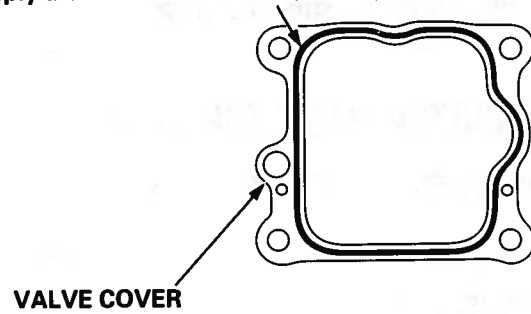
• **VALVE COVER INSTALLATION**

- 1) Clean the mating surfaces of the valve cover and the cylinder block with a degreasing cleaning agent or a clean shop towel.
- 2) Apply liquid sealant (Three Bond 1207B, or Hondabond #4, or equivalent) to the mating surface on the reverse side of the valve cover as shown.

Assemble the valve cover within 3 minutes after application of the liquid sealant.

- 3) Wait for 30 minutes after assembly. Do not add oil or start the engine during this period.

**LIQUID SEALANT APPLICATION POSITION**  
Apply a bead about 1.0 mm (0.04 in) in diameter.



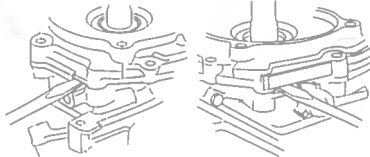
### 2. CRANKCASE SIDE COVER/GOVERNOR

#### a. DISASSEMBLY/REASSEMBLY

##### CRANKCASE SIDE COVER

###### REMOVAL:

Insert a screwdriver or equivalent tool into the concave at the positions shown, and pry to remove the crankcase side cover.



INSPECTION: P. 9-6

17 x 27 x 5 mm OIL SEAL

REASSEMBLY: P. 9-4

5 x 23 (6)

###### REASSEMBLY:

Tighten in a crisscross pattern in 2 or 3 steps to the specified torque.  
7.4 N·m (0.75 kgf·m, 5.4 lbf·ft)

##### GOVERNOR WEIGHT HOLDER

###### REASSEMBLY:

- Check that the weight opens smoothly.
- Check that the gears are not worn or damaged, before installation.

##### GOVERNOR HOLDER CLIP

###### REASSEMBLY:

Be sure to set the clip in the groove on the shaft.

4.2 mm WASHER

4.2 mm WASHER

##### GOVERNOR SLIDER

###### REASSEMBLY:

- Open the governor weight and insert the slider into the shaft.
- After installation, check for smooth operation.

6 x 10 mm DOWEL PIN (2)

5 x 12

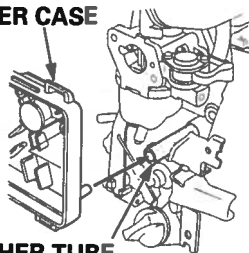
SHROUD

##### BREATHER TUBE

###### REASSEMBLY:

Insert another end of the tube into the air cleaner case.

##### AIR CLEANER CASE



BREATHER TUBE

### • CRANKCASE SIDE COVER INSTALLATION

- 1) Clean the mating surfaces of the side cover and the cylinder block with a degreasing cleaning agent or a clean shop towel.
- 2) Apply liquid sealant (Three Bond 1216E, Hondabond #4, or equivalent) to the mating surface of the cylinder block as shown.
- 3) Install the side cover on the cylinder block.

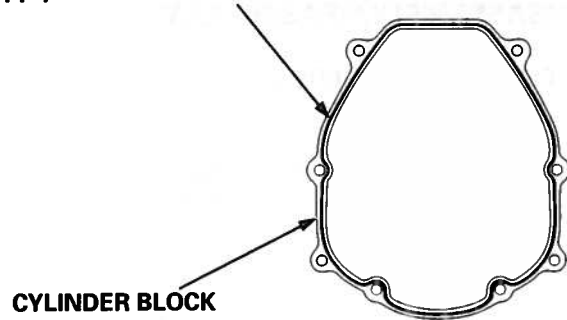
Assemble the side cover with the cylinder block within 3 minutes after application of the liquid sealant.

- 4) Loosely tighten the bolts, then tighten them in a criss-cross pattern in 2 or 3 steps to the specified torque.

**TORQUE: 7.4 N·m (0.75 kgf·m, 5.4 lbf·ft)**

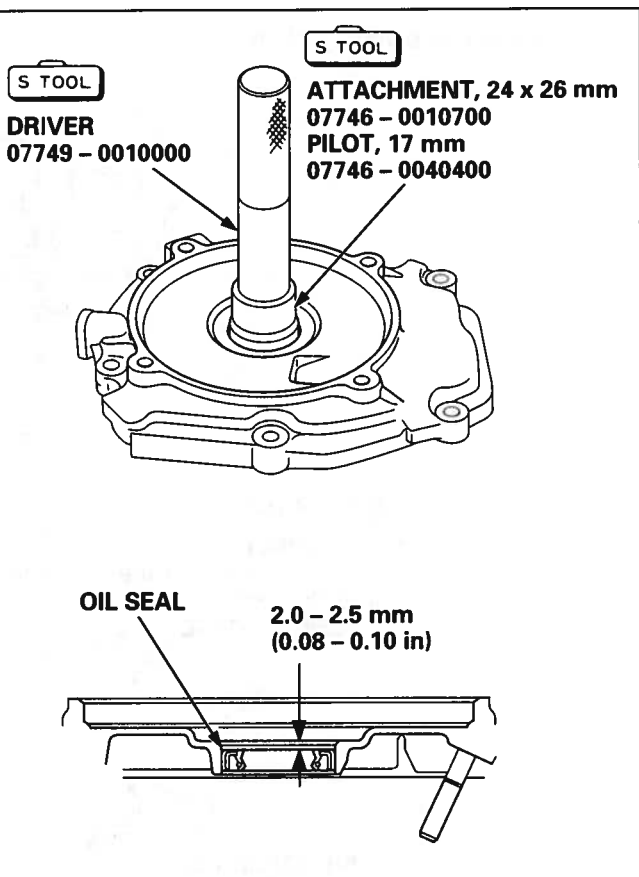
- 5) Wait for 30 minutes after assembly. Do not add oil or start the engine during this period.

**LIQUID SEALANT APPLICATION POSITION**  
Apply a bead about 1.0 mm (0.04 in) in diameter.



### • OIL SEAL INSTALLATION

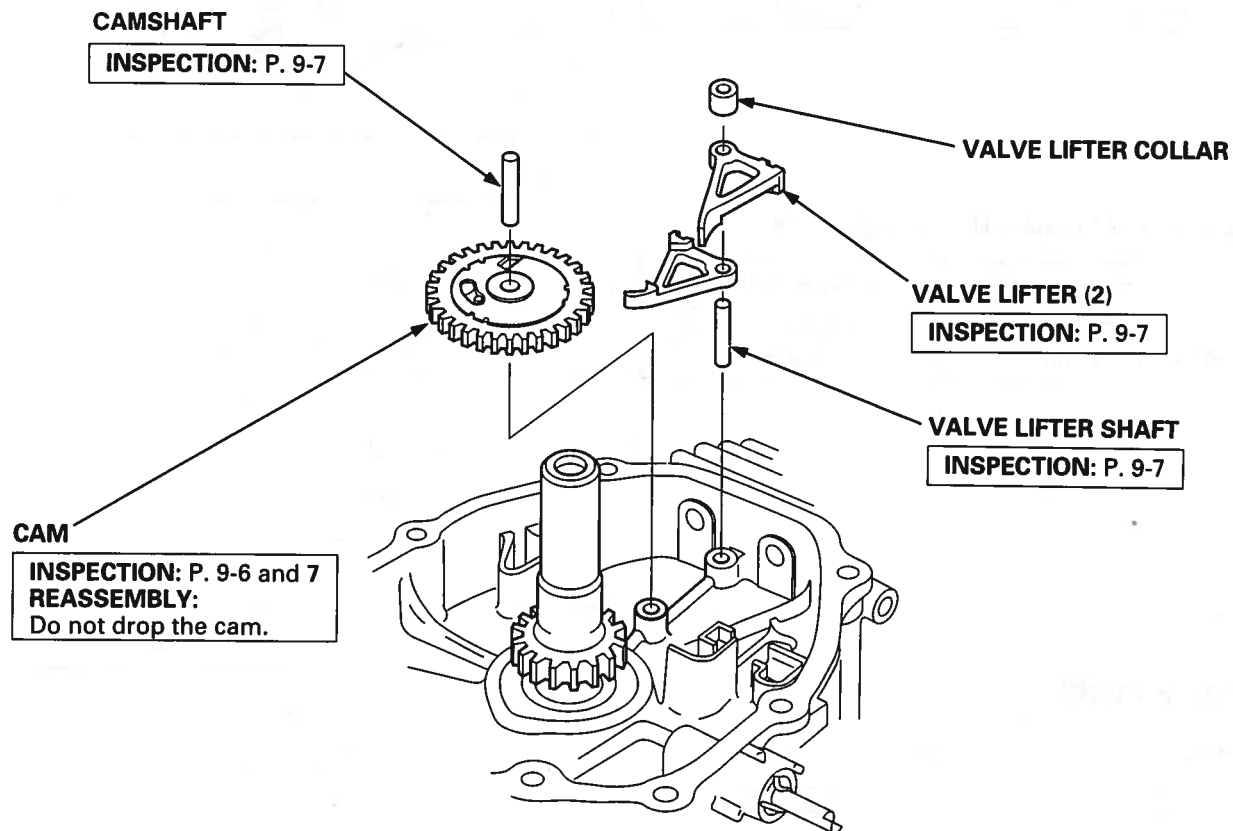
Press the oil seal to the specified depth using the special tools as shown.





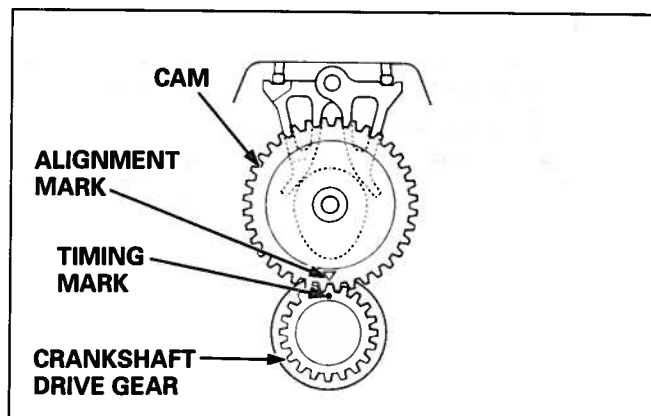
### 3. CAM/VALVE LIFTERS

#### a. DISASSEMBLY/REASSEMBLY



#### • CAM INSTALLATION (TIMING MARK ALIGNMENT)

Install the cam aligning the alignment mark on the cam with the timing mark on the crankshaft.

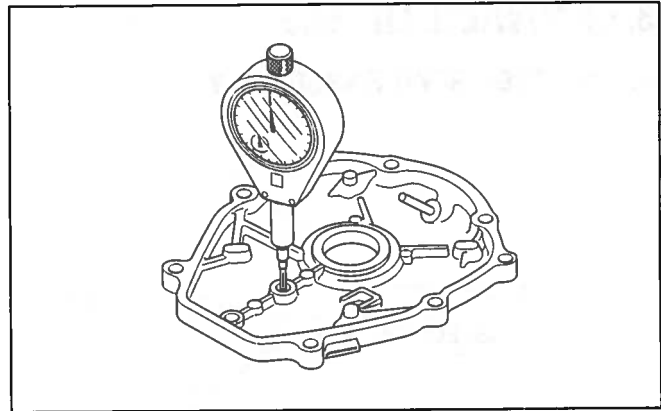


### 4. INSPECTION

#### • CRANKCASE SIDE COVER

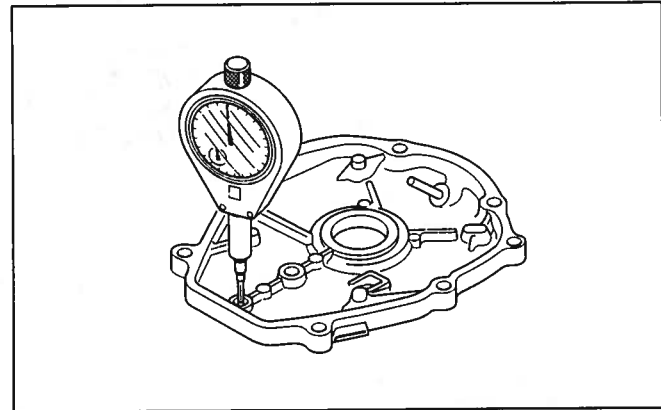
Measure the I.D. of the camshaft bearing surface.

Standard	Service limit
5.005 – 5.023 mm (0.1970 – 0.1978 in)	5.050 mm (0.1988 in)



Measure the I.D. of the valve lifter bearing surface.

Standard	Service limit
5.005 – 5.023 mm (0.1970 – 0.1978 in)	5.050 mm (0.1988 in)



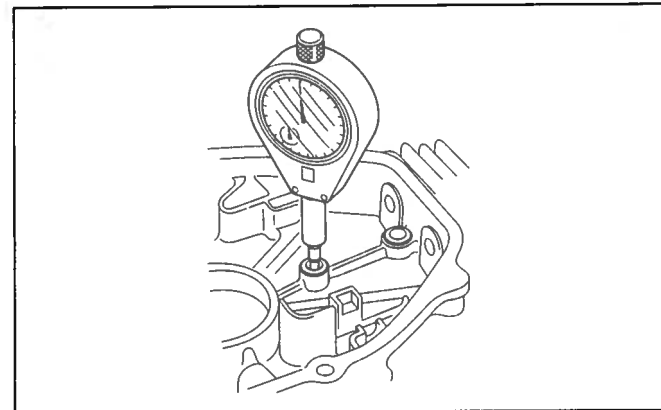
#### • CYLINDER BLOCK

Measure the I.D. of the camshaft bearing surface.

Standard	Service limit
5.005 – 5.023 mm (0.1970 – 0.1978 in)	5.050 mm (0.1988 in)

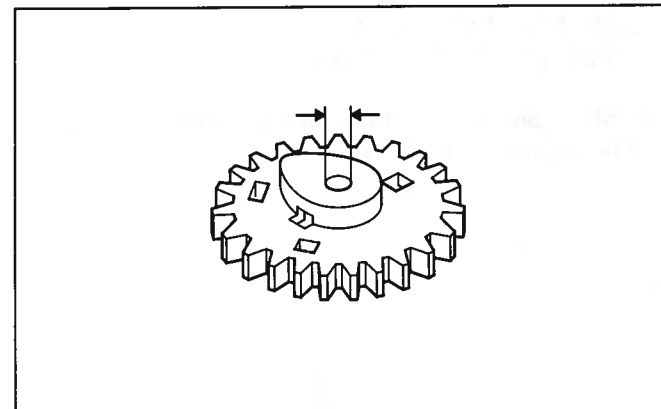
Measure the I.D. of the valve lifter bearing surface.

Standard	Service limit
5.005 – 5.023 mm (0.1970 – 0.1978 in)	5.050 mm (0.1988 in)



#### • CAM I.D.

Standard	Service limit
5.020 – 5.050 mm (0.1976 – 0.1988 in)	5.100 mm (0.2008 in)

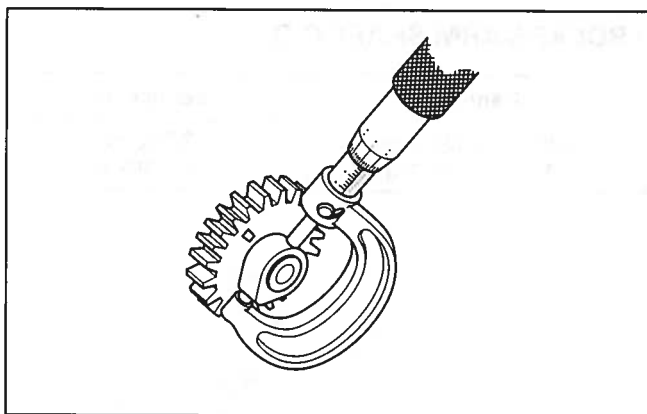


# HONDA

## GXH50

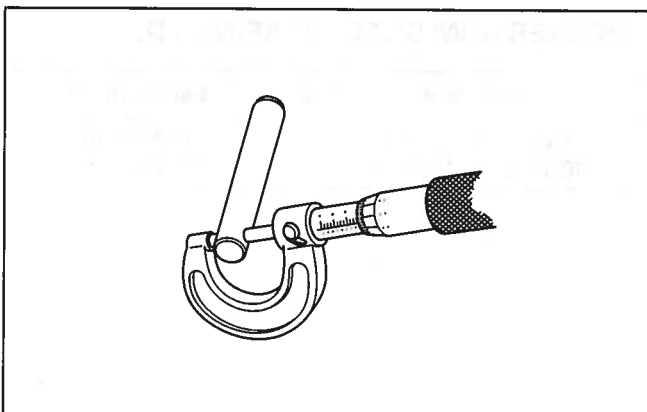
### • CAM HEIGHT

Standard	Service limit
27.972 mm (1.1013 in)	26.972 mm (1.0619 in)



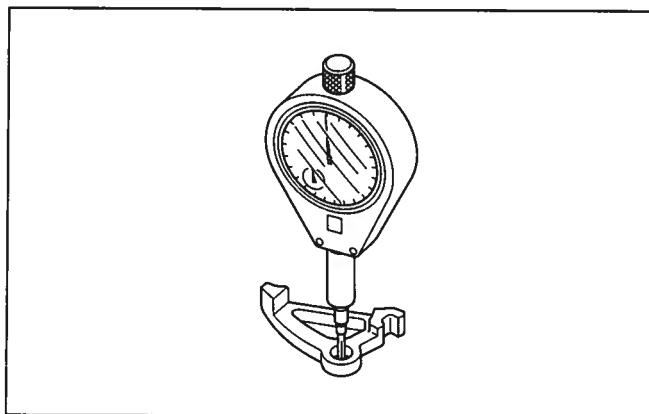
### • CAMSHAFT & VALVE LIFTER SHAFT O.D.

Standard	Service limit
4.990 – 5.000 mm (0.1965 – 0.1969 in)	4.950 mm (0.1949 in)



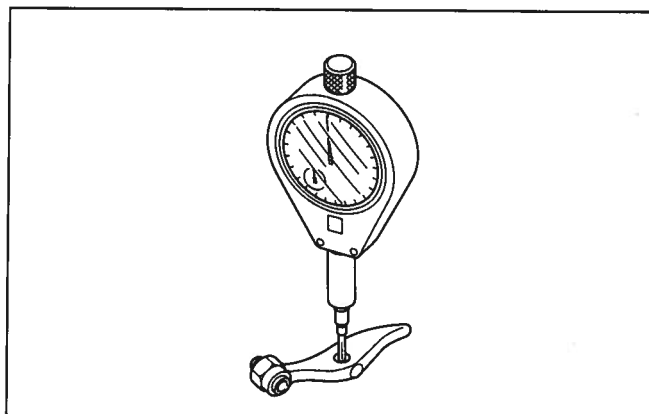
### • VALVE LIFTER I.D.

Standard	Service limit
5.005 – 5.025 mm (0.1970 – 0.1978 in)	5.050 mm (0.1988 in)



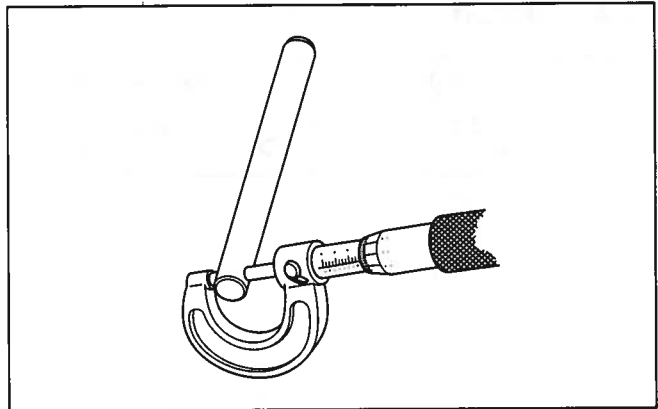
### • ROCKER ARM I.D.

Standard	Service limit
4.005 – 4.025 mm (0.1577 – 0.1585 in)	4.050 mm (0.1594 in)



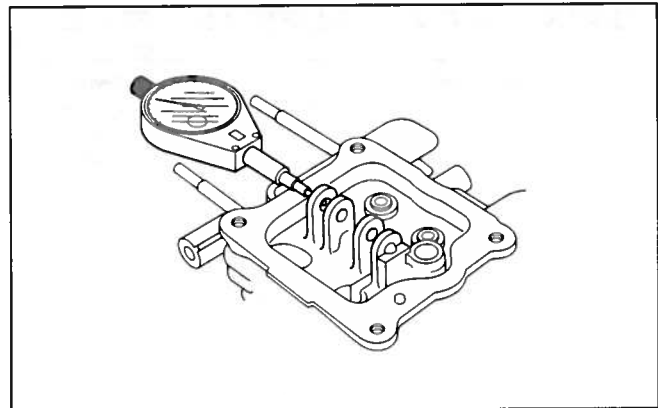
### • ROCKER ARM SHAFT O.D.

Standard	Service limit
3.990 – 4.000 mm (0.1571 – 0.1575 in)	3.950 mm (0.1555 in)



### • ROCKER ARM SHAFT BEARING I.D.

Standard	Service limit
4.000 – 4.018 mm (0.1575 – 0.1582 in)	4.050 mm (0.1594 in)

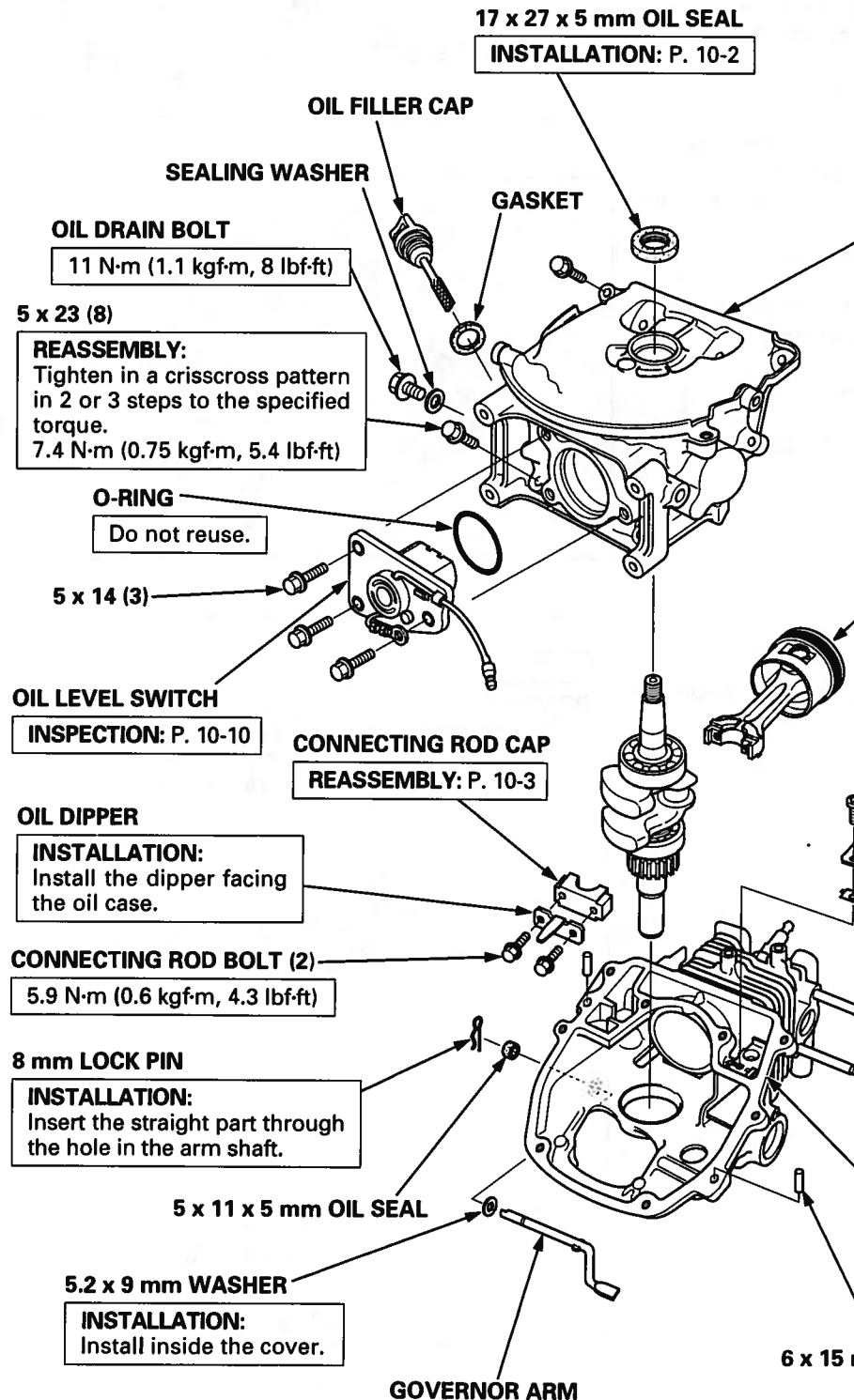


- 1. OIL CASE/CRANKSHAFT
- 2. PISTON

- 3. VALVES/CYLINDER BLOCK
- 4. INSPECTION

**1. OIL CASE/CRANKSHAFT**

**a. DISASSEMBLY/REASSEMBLY**

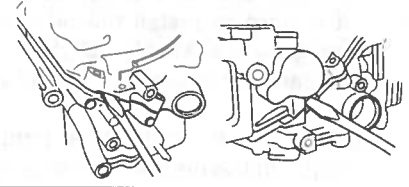


**OIL CASE**

**REMOVAL:**

- Insert a screwdriver into the concave in the positions shown, and pry to remove the oil case.
- Set the piston at top dead center when removing/installing the oil case with the oil level switch installed.

**REASSEMBLY: P. 10-2**

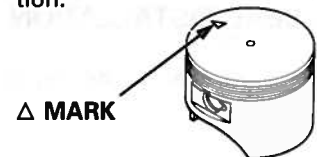


**PISTON/CONNECTING ROD ASSEMBLY**

**DISASSEMBLY/REASSEMBLY: P. 10-4**

**INSTALLATION:**

- Install with the Δ mark on the head toward the IN side.
- Take care not to break the piston ring during installation.



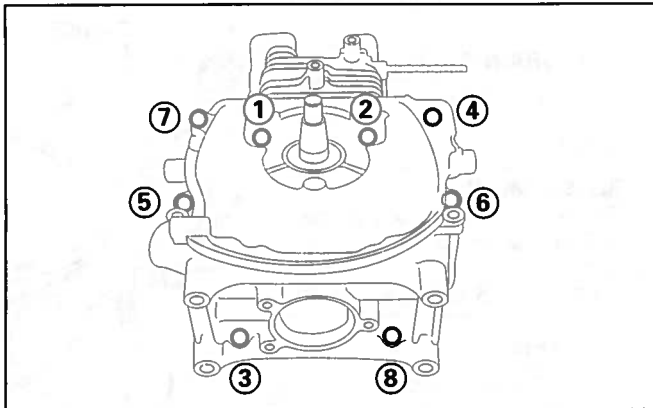
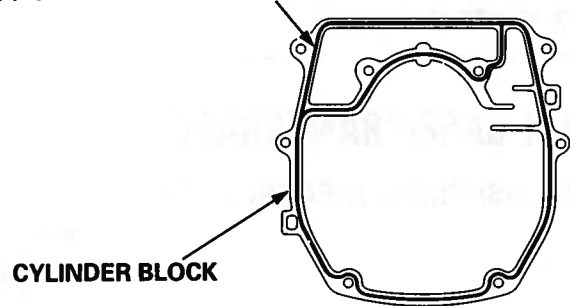
### • OIL CASE ASSEMBLY

- 1) Clean the mating surfaces of the oil case and the cylinder block with a degreasing cleaning agent or a clean shop towel.
- 2) Install the two 6 x 15 mm dowel pins against the cylinder block.
- 3) Apply liquid sealant (Three Bond 1216E, Hondabond #4, or equivalent) to the mating surface of the cylinder block as shown.
- 4) Install the oil case on the cylinder block.
  - Assemble the oil case with the cylinder block within 3 minutes after application of the liquid sealant.
  - If it is hard to install the oil case properly, install by turning the crankshaft a slightly.
  - Take care not to damage the oil seal lip.
- 5) Loosely tighten the bolts, then tighten them to the specified torque in the numbered sequence shown.

**TORQUE: 7.4 N·m (0.75 kgf·m, 5.4 lbf·ft)**

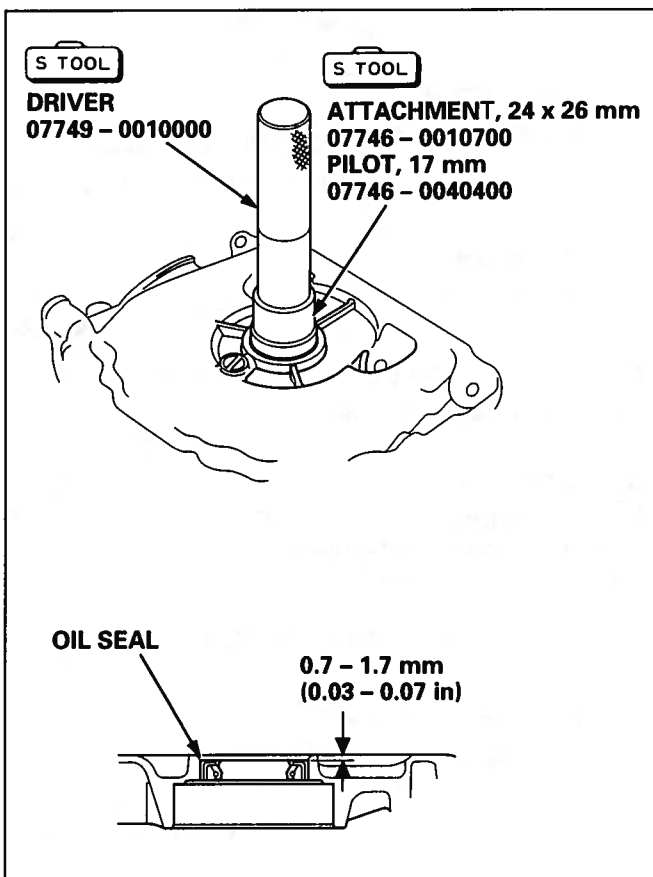
Wait for 30 minutes after assembly. Do not add oil or start the engine during this period.

**LIQUID SEALANT APPLICATION POSITION**  
Apply a bead about 1.0 mm (0.04 in) indiameter.



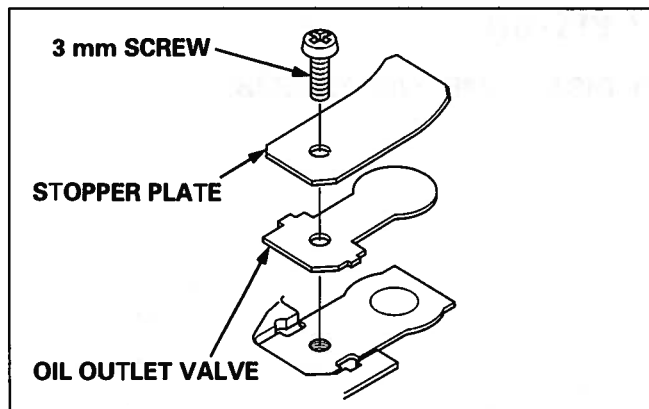
### • OIL SEAL INSTALLATION

Press the oil seal to the depth shown using the special tools.



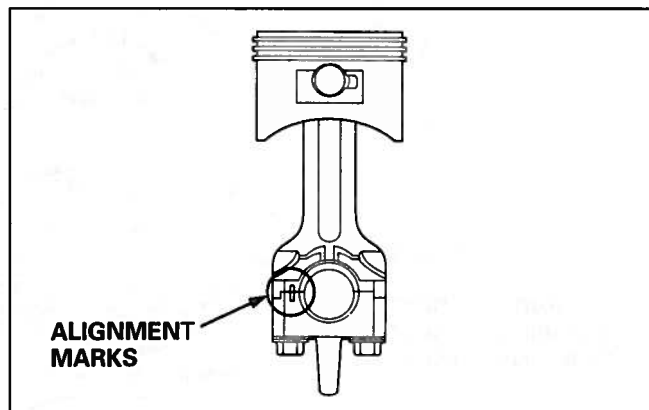
### • BREATHER VALVE INSTALLATION

- 1) Clean the oil outlet valve, stopper plate and the valve installation area of the cylinder block.
- 2) Install the valve aligning the positioning projections and chamfer of the valve with the groove and chamfer of the cylinder block.
- 3) Install the stopper plate on the valve aligning the chamfer of the stopper plate with the chamfer of the cylinder block.
- 4) Tighten the 3 mm screw securely.



### • CONNECTING ROD CAP

- Install by aligning the alignment marks on the connecting rod big end and cap.
- Install the oil dipper so dipper faces the oil case.



## 2. PISTON

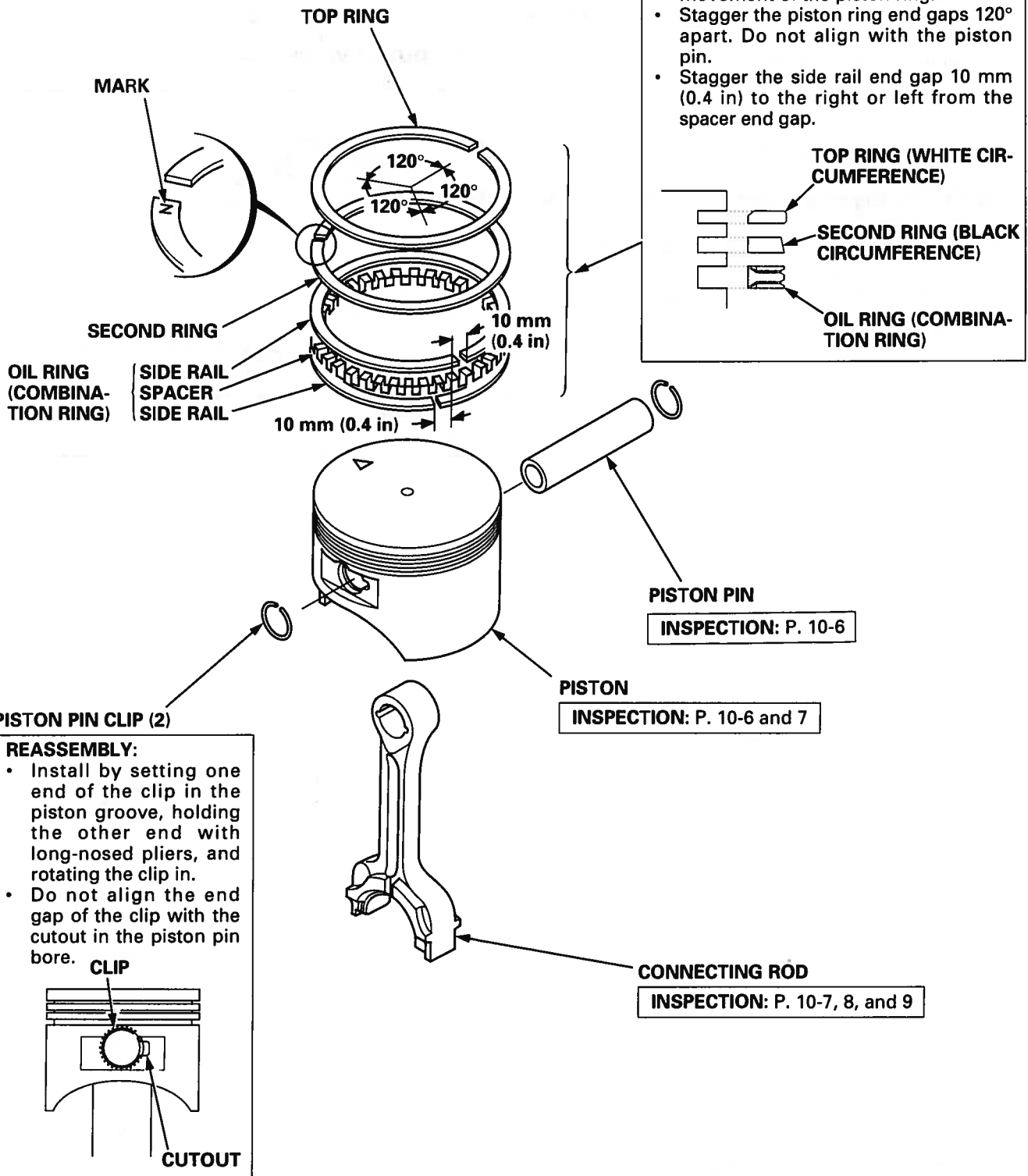
### a. DISASSEMBLY/REASSEMBLY

#### PISTON RINGS

**INSPECTION:** P. 10-6 and 7

#### REASSEMBLY:

- Install the top ring with chamfered section facing up.
- Install the second ring with the mark facing upward as shown.
- Do not interchange the top ring and the second ring.
- After assembly, check for smooth movement of the piston ring.
- Stagger the piston ring end gaps 120° apart. Do not align with the piston pin.
- Stagger the side rail end gap 10 mm (0.4 in) to the right or left from the spacer end gap.





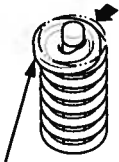
### 3. VALVES/CYLINDER BLOCK

#### a. DISASSEMBLY/REASSEMBLY

##### VALVE SPRING RETAINER (2)

###### DISASSEMBLY:

Push down and slide the retainer to the side, so the valve stem slips through the hole of the retainer.



VALVE SPRING RETAINER

###### REASSEMBLY:

Install the valve spring retainer while holding the valve with the handle of a driver or hammer.

##### VALVE SPRING (2)

INSPECTION: P. 10-9

##### VALVE GUIDE

INSPECTION: P. 10-9

##### CYLINDER BLOCK

INSPECTION: P. 10-6

##### EXHAUST VALVE

INSPECTION: P. 10-9  
REASSEMBLY:

- Remove carbon deposits before installation.
- Check the valve head for damage.

##### INLET VALVE

INSPECTION: P. 10-9  
REASSEMBLY:

- Remove carbon deposits before installation.
- Check the valve head for damage.
- Do not interchange with the exhaust valve.

VALVE HEAD DIAMETER:  
IN: 17.5 mm  
EX: 15.5 mm

#### b. COMBUSTION CHAMBER CLEANING

- 1) Prepare a protective lining of thick paper or equivalent material with a diameter large enough to fit against the cylinder inner bore, and insert it into the cylinder.
- 2) Attach a cleaning brush to an electric drill and clean the combustion chamber.

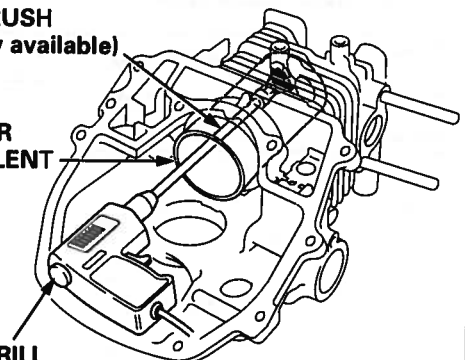
##### NOTICE

- Be sure to insert a thick paper or equivalent into the cylinder to protect the inner wall of the cylinder during cleaning.
- Do not press the cleaning brush with force against the combustion chamber.

##### CLEANING BRUSH (Commercially available)

THICK PAPER  
OR EQUIVALENT

ELECTRIC DRILL

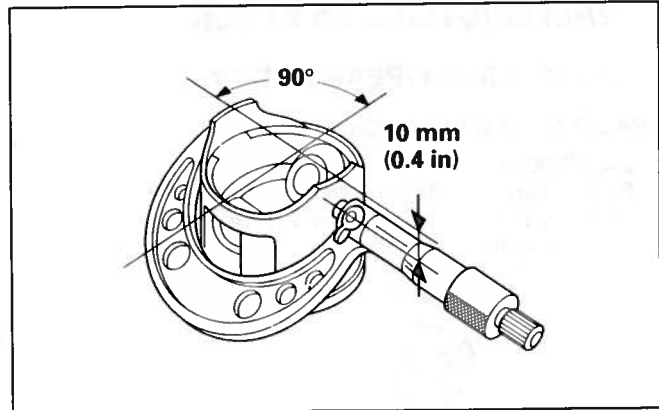


### 4. INSPECTION

#### • PISTON SKIRT O.D.

Measure and record the piston O.D. at a point 10 mm (0.4 in) from the bottom of the skirt and 90° to the piston pin bore.

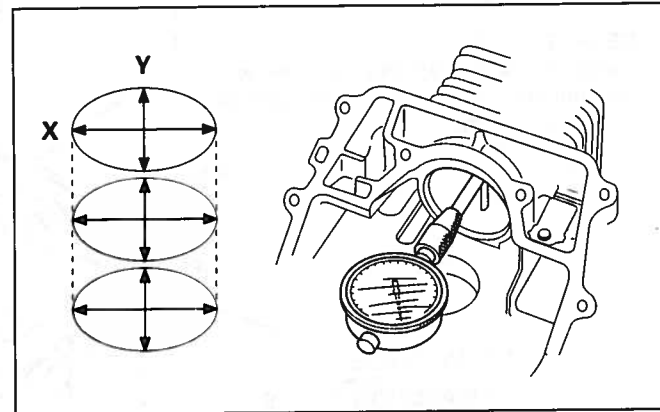
Standard	Service limit
41.770 – 41.790 mm (1.6445 – 1.6453 in)	41.700 mm (1.6417 in)



#### • CYLINDER SLEEVE I.D.

Measure and record the cylinder I.D. at three levels in both the "X" axis (parallel to piston pin) and the "Y" axis (perpendicular to piston pin). Take the maximum reading of each measurement to determine the cylinder I.D.

Standard	Service limit
41.800 – 41.815 mm (1.6457 – 1.6463 in)	41.900 mm (1.6496 in)

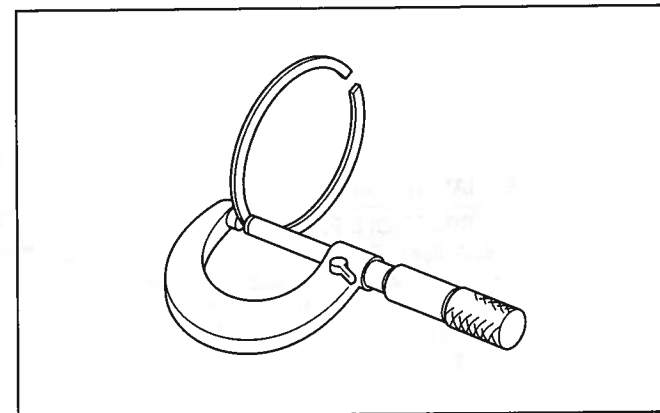


#### • PISTON-TO-CYLINDER CLEARANCE

Standard	Service limit
0.010 – 0.045 mm (0.0004 – 0.0018 in)	0.120 mm (0.0047 in)

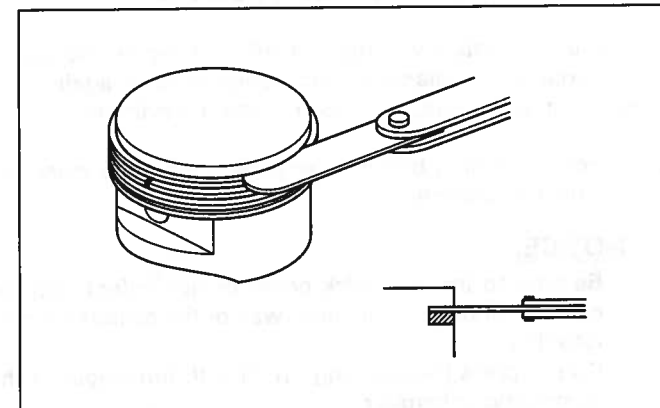
#### • PISTON RING WIDTH

	Standard	Service limit
Top	0.77 – 0.79 mm (0.030 – 0.031 in)	0.720 mm (0.0283 in)
Second	0.97 – 0.99 mm (0.031 – 0.039 in)	0.920 mm (0.0362 in)



#### • RING SIDE CLEARANCE

	Standard	Service limit
Top/ Second	0.015 – 0.050 mm (0.0006 – 0.0020 in)	0.120 mm (0.0047 in)



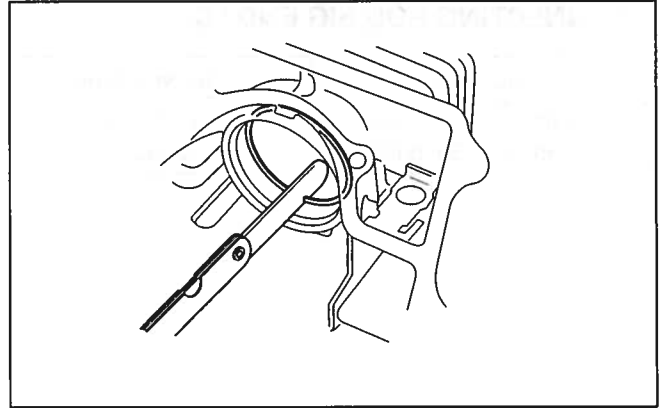
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### • PISTON RING END GAP

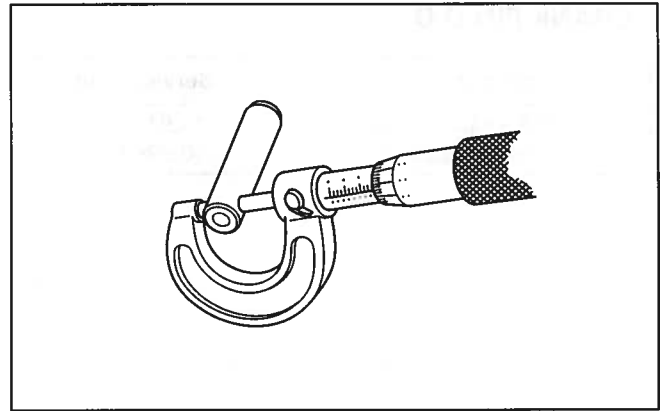
Use the top of the piston to position the ring horizontally in the cylinder, and measure the piston ring end gap.

	Standard	Service limit
Top/Second	0.150 – 0.300 mm (0.0059 – 0.0118 in)	0.600 mm (0.0236 in)



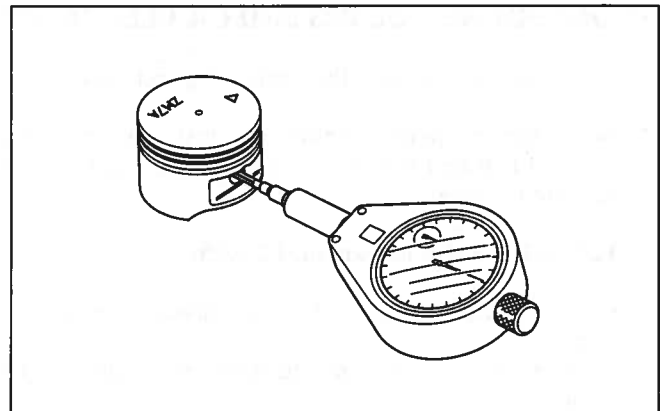
### • PISTON PIN O.D.

Standard	Service limit
9.994 – 10.000 mm (0.3935 – 0.3937 in)	9.950 mm (0.3917 in)



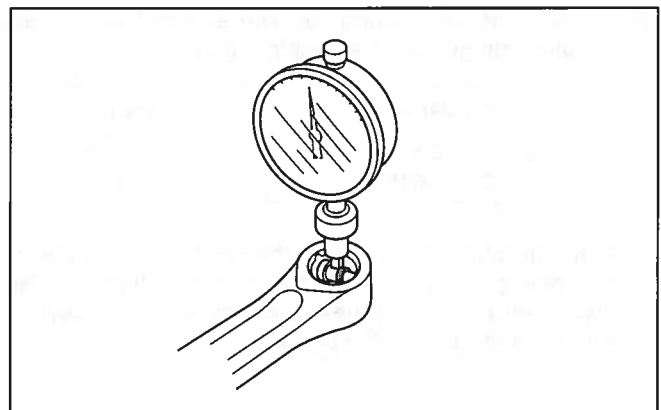
### • PISTON PIN BORE I.D.

Standard	Service limit
10.002 – 10.008 mm (0.3938 – 0.3940 in)	10.050 mm (0.3957 in)



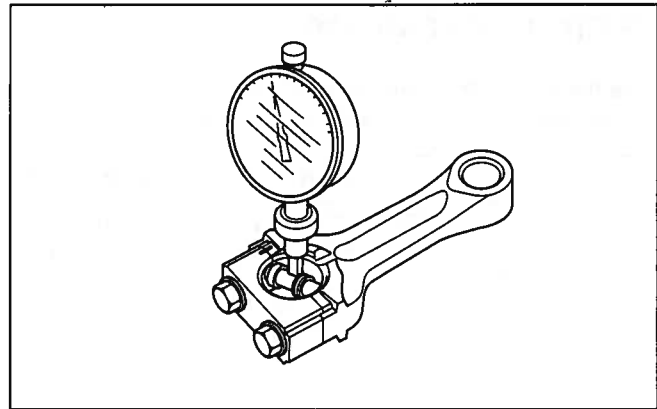
### • CONNECTING ROD SMALL END I.D.

Standard	Service limit
10.006 – 10.017 mm (0.3939 – 0.3944 in)	10.050 mm (0.3957 in)



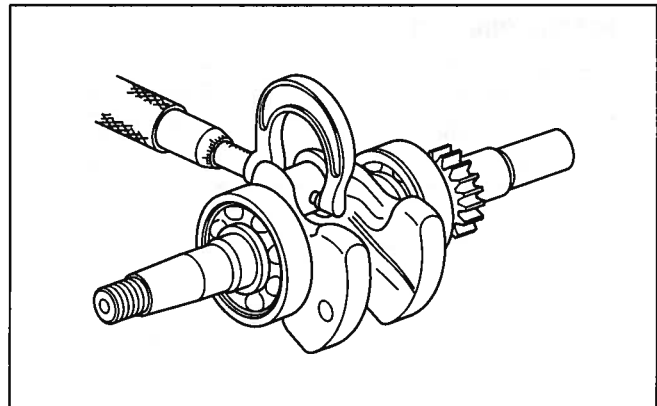
### • CONNECTING ROD BIG END I.D.

Standard	Service limit
15.000 – 15.011 mm (0.5906 – 0.5910 in)	15.040 mm (0.5921 in)



### • CRANK PIN O.D.

Standard	Service limit
14.973 – 14.984 mm (0.5895 – 0.5899 in)	14.940 mm (0.5882 in)



### • CONNECTING ROD BIG END OIL CLEARANCE

- 1) Clean the crank pin and the connecting rod big end.
- 2) Set a plastigauge on the crank pin. Install the connecting rod and cap and tighten the connecting rod bolt to the specified torque.

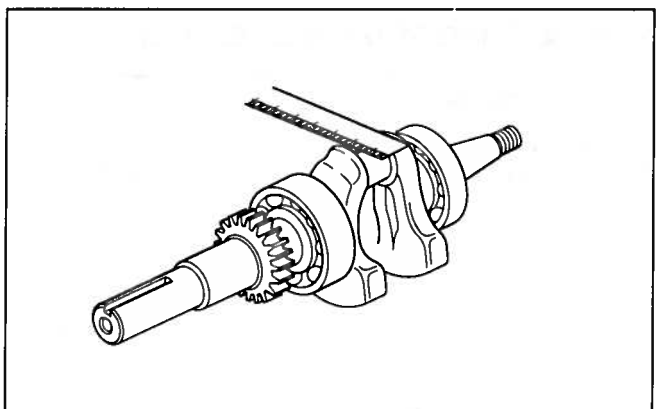
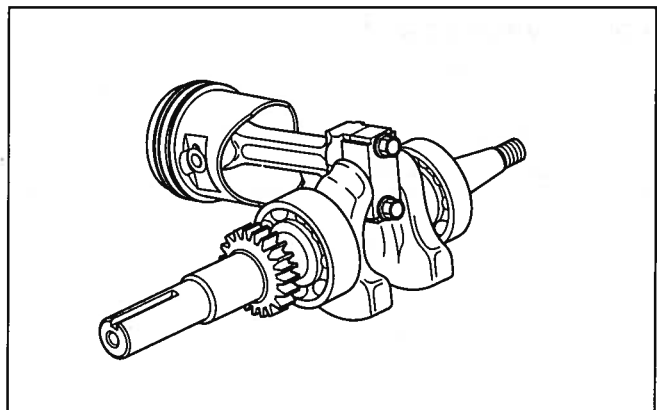
**TORQUE: 5.9 N·m (0.6 kgf·m, 4.3 lbf·ft)**

- Set the plastigauge in the axial direction on the crank pin.
- Hold the crankshaft not to turn when tightening the bolts.

- 3) Remove the connecting rod cap and rod and measure the plastigauge with the plastigauge scale.

Standard	Service limit
0.016 – 0.038 mm (0.0006 – 0.0015 in)	0.100 mm (0.0039 in)

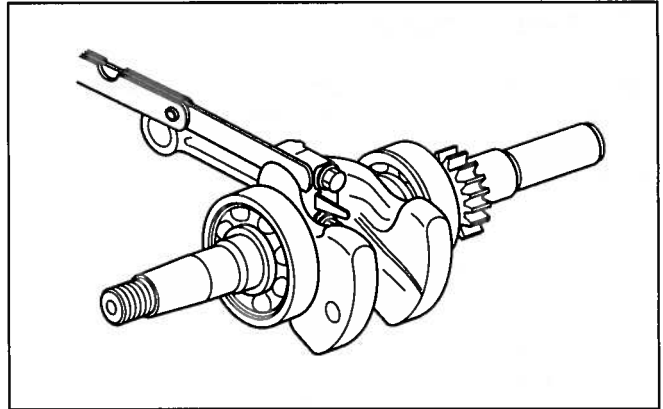
- 4) If the measurement exceeds the service limit, replace the connecting rod and recheck the clearance. If the clearance, measured by using a new connecting rod, exceeds the service limit, replace the crankshaft.



### • CONNECTING ROD BIG END SIDE CLEARANCE

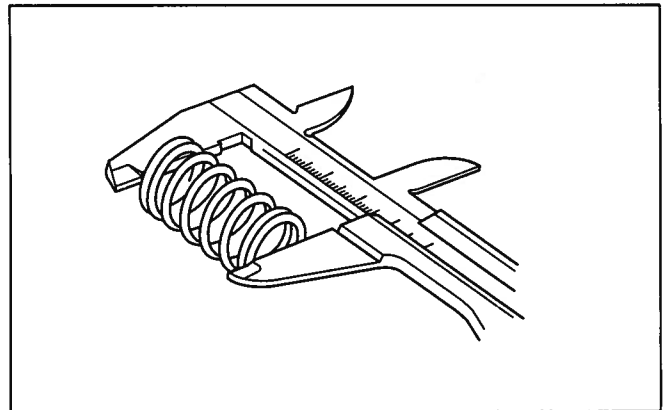
Measure the clearance using a feeler gauge.

Standard	Service limit
0.1 – 0.6 mm (0.004 – 0.024 in)	0.8 mm (0.031 in)



### • VALVE SPRING FREE LENGTH

Standard	Service limit
23.7 mm (0.93 in)	22.8 mm (0.90 in)



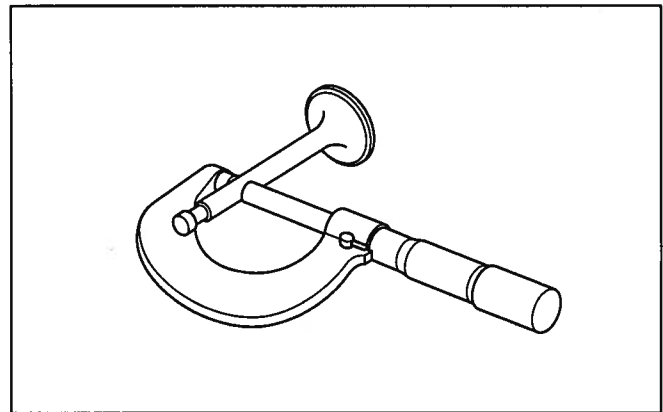
### • VALVE STEM O.D.

Inspect each valve face for pitting or irregular wear. Inspect each valve stem for bending or abnormal wear.

Insert the valve into the valve guide and check for operation.

Measure the valve stem O.D. at the sliding surface of the valve guide.

	Standard	Service limit
IN	3.970 – 3.985 mm (0.15623 – 0.1569 in)	3.900 mm (0.1535 in)
EX	3.935 – 3.950 mm (0.1549 – 0.1555 in)	3.880 mm (0.1528 in)



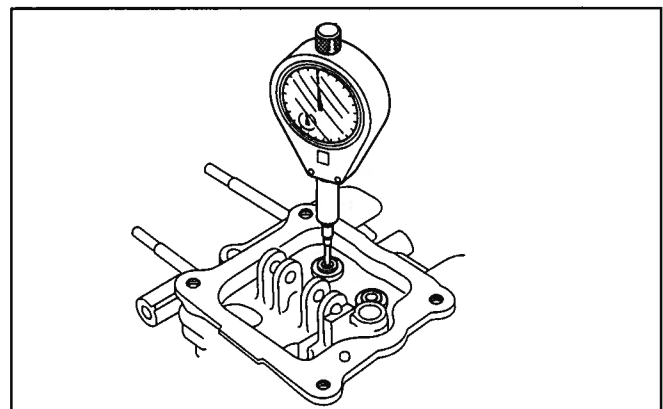
### • VALVE GUIDE I.D.

	Standard	Service limit
IN/EX	4.000 – 4.018 mm (0.1575 – 0.1582 in)	4.060 mm (0.1598 in)

If the measurement exceeds the service limit, replace the cylinder block.

### • VALVE STEM-TO-GUIDE CLEARANCE

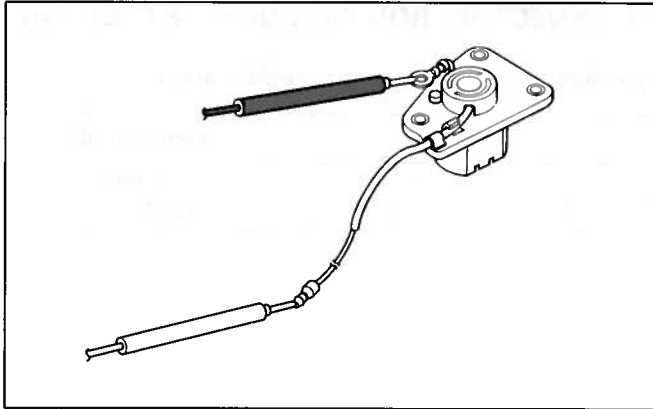
	Standard	Service limit
IN	0.015 – 0.048 mm (0.0006 – 0.0019 in)	0.098 mm (0.0039 in)
EX	0.050 – 0.083 mm (0.0020 – 0.0033 in)	0.098 mm (0.0039 in)



### • OIL LEVEL SWITCH

Check for continuity between the oil level switch yellow lead and the ground terminal (green lead).

- 1) The oil level switch is normal if there is no continuity with the switch set upside down.
- 2) There must be continuity between the leads with the switch in its normal position.
- 3) Suspend the switch in a container filled with oil and check the float operation. The switch is normal if there is continuity between the leads initially, and no continuity when the switch is soaked in the oil.



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