

YAMAHA

SERVICE MANUAL



YP20G•30G

7RP-28197-E0

310071

FOREWORD

This manual was written by the Yamaha Motor Company primarily for use by Yamaha dealers and their qualified mechanics. It is not possible to put an entire mechanic's education into one manual, so it is assumed that persons using this book to perform maintenance and repairs on Yamaha water pumps have a basic understanding of the mechanical precepts and procedures inherent to generator repair technology. Without such knowledge, attempted repairs or service to this model may render it unfit for use and/or unsafe.

Yamaha Motor Company Ltd. is continually striving to further improve all models manufactured by Yamaha. Modifications and significant changes in specifications or procedures will be forwarded to all Authorized Yamaha dealers and will, where applicable, appear in future editions of this manual.

NOTE:

This Service Manual contains information regarding periodic maintenance to the emission control system. Please read this material carefully.

HOW TO USE THIS MANUAL

PARTICULARLY IMPORTANT INFORMATION

This material is distinguished by the following notation.



The Safety Alert Symbol means ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!

WARNING

Failure to follow WARNING instructions could result in severe injury or death to the machine operator, a bystander, or a person inspecting or repairing the machine.

CAUTION

A CAUTION indicates special precautions that must be taken to avoid damage to the machine.

NOTE:

A NOTE provides key information to make procedures easier or clearer.

MANUAL FORMAT

The procedures in this manual are organized in a sequential, step-by-step format. The information has been compiled to provide the mechanic with an easy to read, handy reference that contains comprehensive explanations of all disassembly, repair, assembly, and inspection operations.

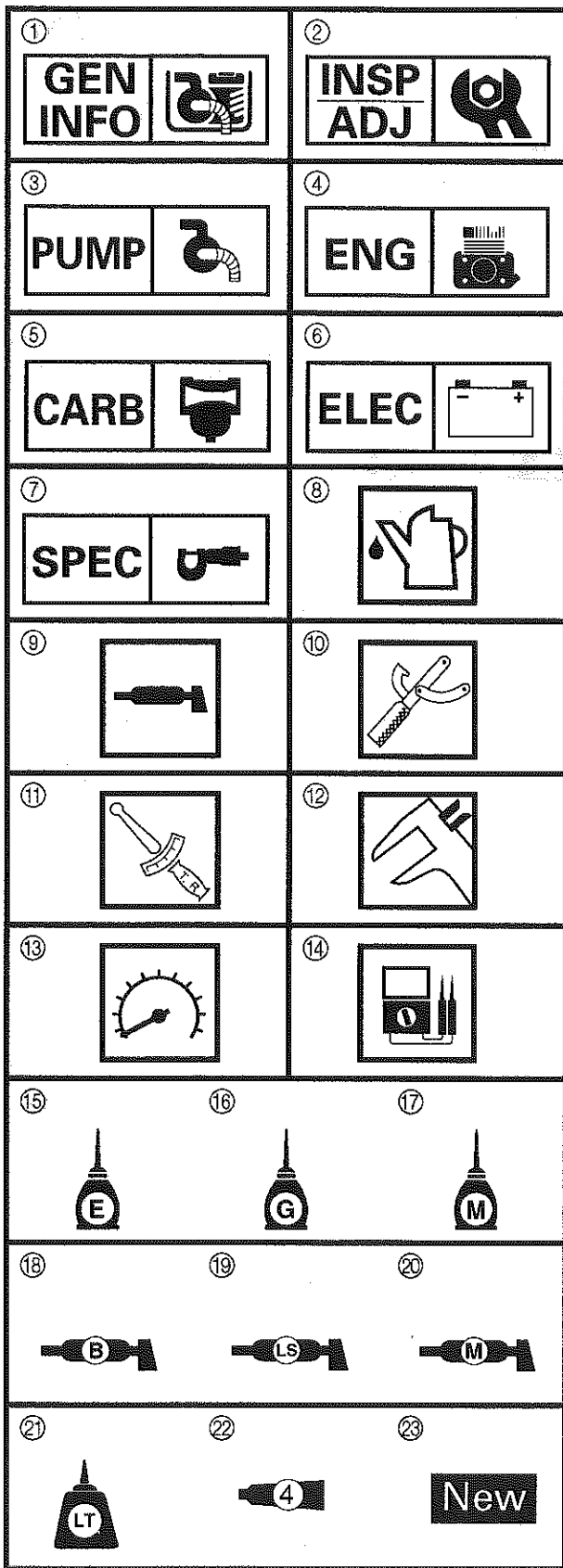
In this revised format, the condition of a faulty component will precede an arrow symbol and the course of action required will follow the symbol, e.g.,

- Bearings
Pitting/Damage → Replace.

EXPLODED DIAGRAM

Each chapter provides exploded diagrams before each disassembly section for ease in identifying the correct disassembly and assembly procedures.

**YP20G/YP30G
SERVICE MANUAL**
©1996 by Yamaha Motor Co., Ltd.
1st Edition, March 1996
All rights reserved. Any reprinting or
unauthorized use without the written
permission of Yamaha Motor Co., Ltd.
is expressly prohibited.
Printed in Japan



ILLUSTRATED SYMBOLS (Refer to the illustration)

Illustrated symbols ① thru ⑦ are designed as thumb tabs to indicate the chapter's number and content.

- ① General information
- ② Periodic inspections and adjustments
- ③ Pump
- ④ Engine
- ⑤ Carburetion
- ⑥ Electrical
- ⑦ Specifications








Illustrated symbols ⑧ thru ⑭ are used to identify the specific tools and test equipment.

- ⑧ Filling fluid
- ⑨ Lubricant
- ⑩ Special tool
- ⑪ Tightening
- ⑫ Wear limit, clearance
- ⑬ Engine speed
- ⑭ Ω , V, A

Illustrated symbols ⑮ thru ㉓ in the exploded diagram indicate the grades of lubricant and the locations of the lubrication points.

- ⑮ Apply engine oil
- ⑯ Apply gear oil
- ⑰ Apply molybdenum disulfide oil
- ⑱ Apply wheel bearing grease
- ⑲ Apply lightweight lithium-soap base grease
- ⑳ Apply molybdenum disulfide grease
- ㉑ Apply locking agent (LOCTITE®)
- ㉒ Apply Yamaha bond
- ㉓ Use new one

INDEX

GENERAL INFORMATION	
	GEN INFO 1
PERIODIC INSPECTIONS AND ADJUSTMENTS	
	INSP ADJ 2
PUMP	
	PUMP 3
ENGINE	
	ENG 4
CARBURETION	
	CARB 5
ELECTRICAL	
	ELEC 6
SPECIFICATIONS	
	SPEC 7

CHAPTER 1

GENERAL INFORMATION

MACHINE IDENTIFICATION	1-1
ENGINE SERIAL NUMBER	1-1
IMPORTANT INFORMATION	1-2
PREPARATION FOR REMOVAL AND DISASSEMBLY	1-2
NOTES ON SERVICE	1-2
ALL REPLACEMENT PARTS	1-4
GASKETS, OIL SEALS, AND O-RINGS	1-4
BEARINGS AND OIL SEALS	1-4
SPECIAL TOOLS AND TESTERS	1-5

CHAPTER 2

PERIODIC INSPECTIONS AND ADJUSTMENTS

INTRODUCTION	2-1
MAINTENANCE INTERVALS CHART	2-1
PERIODIC MAINTENANCE/LUBRICATION INTERVALS	2-1
AIR FILTER, FUEL TANK	2-2
JOB INSTRUCTION CHART	2-2
MUFFLER	2-3
JOB INSTRUCTION CHART	2-3
ENGINE	2-4
ENGINE OIL	2-4
FUEL LINE INSPECTION	2-5
FUEL PETCOCK	2-5
AIR FILTER	2-6
MUFFLER	2-6
VALVE CLEARANCE ADJUSTMENT	2-7
COMPRESSION PRESSURE MEASUREMENT	2-8
CYLINDER HEAD DECARBONIZATION	2-9
GOVERNOR ADJUSTMENT	2-10
ENGINE SPEED ADJUSTMENT	2-10
T.C.I. AIR GAP	2-11
BREATHER HOSE INSPECTION	2-11
SPARK PLUG	2-11
CRANKSHAFT SIDE CLEARANCE ADJUSTMENT	2-12
PUMP	2-13
IMPELLER GAP ADJUSTMENT	2-13

CHAPTER 3

PUMP

PUMP	3-1
JOB INSTRUCTION CHART	3-1
CHECK VALVE INSPECTION	3-2
VOLUTE CASE/IMPELLER	3-2
MECHANICAL SEAL SET	3-2
FIXED SEAL SET	3-2
INSTALLATION	3-2

CHAPTER 4

ENGINE

CYLINDER HEAD COVER, CYLINDER HEAD	4-1
JOB INSTRUCTION CHART	4-1
CYLINDER HEAD INSPECTION	4-2
PUSH LOD INSPECTION	4-2
CYLINDER HEAD INSTALLATION	4-2
VALVE	4-3
JOB INSTRUCTION CHART	4-3
VALVE REMOVAL	4-4
VALVE INSPECTION	4-4
VALVE SEAT INSPECTION	4-5
PISTON, CAMSHAFT, CRANKCASE, CRANKSHAFT	4-7
JOB INSTRUCTION CHART	4-8
CAMSHAFT REMOVAL	4-9
CAMSHAFT AND VALVE LIFTER INSPECTION	4-9
CRANKCASE INSPECTION	4-10
PISTON, PISTON PIN AND PISTON RING INSPECTION	4-11
CRANKSHAFT INSPECTION	4-12
FLYWEIGHT SHAFT (GOVERNOR) GEAR INSPECTION	4-13
CRANKCASE COVER INSPECTION	4-14
PISTON RING AND PISTON INSTALLATION	4-14
CONNECTING ROD INSTALLATION	4-15
CAMSHAFT INSTALLATION	4-15
CRANKCASE COVER INSTALLATION	4-15
RECOIL STARTER	4-16
JOB INSTRUCTION CHART	4-16
RECOIL STARTER REMOVAL	4-17
RECOIL STARTER INSPECTION	4-17
RECOIL STARTER INSTALLATION	4-18

FLYWHEEL	4-19
JOB INSTRUCTION CHART	4-19
FLYWHEEL REMOVAL	4-20
FLYWHEEL INSTALLATION	4-20
GOVERNOR	4-21
JOB INSTRUCTION CHART	4-21

CHAPTER 5 CARBURETION

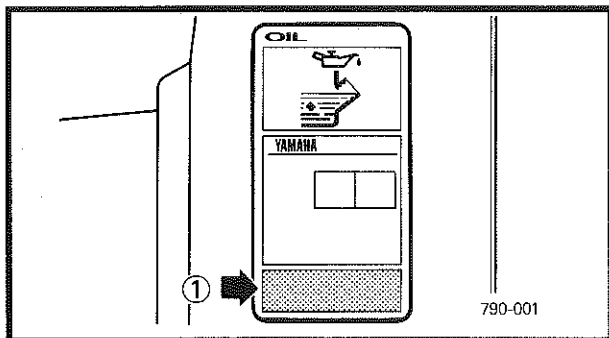
CARBURETOR	5-1
JOB INSTRUCTION CHART	5-1
FLOAT HEIGHT INSPECTION	5-2
FUEL PASSAGE INSPECTION	5-2
VALVE SEAT INSPECTION	5-2

CHAPTER 6 ELECTRICAL

ELECTRICAL COMPONENTS	6-1
CIRCUIT DIAGRAM	6-2
COLOR CODE	6-2
TROUBLESHOOTING CHART	6-3

CHAPTER 7 SPECIFICATIONS

GENERAL SPECIFICATIONS	7-1
MAINTENANCE SPECIFICATIONS	7-2
ENGINE	7-2
ELECTRICAL	7-4
TIGHTENING TORQUE	7-5
GENERAL TORQUE SPECIFICATIONS	7-6
DEFINITION OF UNITS	7-6
CABLE ROUTING	7-7



GENERAL INFORMATION

MACHINE IDENTIFICATION

ENGINE SERIAL NUMBER

The engine serial number ① is located into the fan case.

NOTE: _____

The first three digits of these numbers are for engine identifications; the remaining digits are the unit production number.

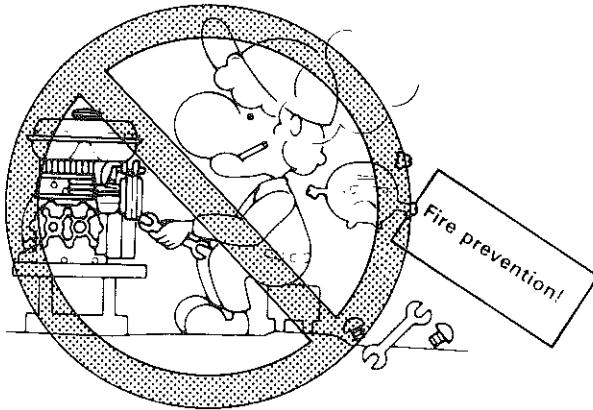
Starting serial number:
YP20G 7RN-0100101~
YP30G 7RP-0100101~

NOTE: _____

Designs and specifications are subject to change without notice.



IMPORTANT INFORMATION
PREPARATION FOR REMOVAL AND
DISASSEMBLY



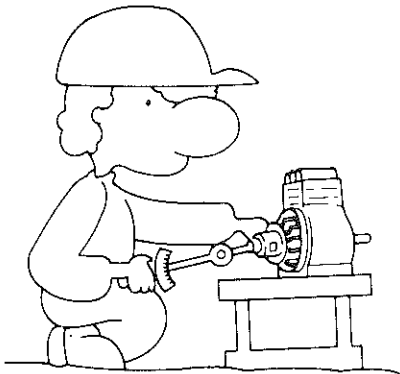
NOTES ON SERVICE

1. Fire prevention

When servicing the engine, always keep the engine and yourself away from fire.

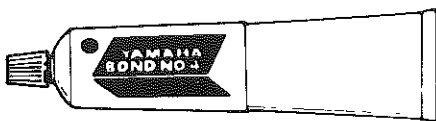
2. Correct tools

To guard against damage, be sure to use the correct special tool for the specific job.



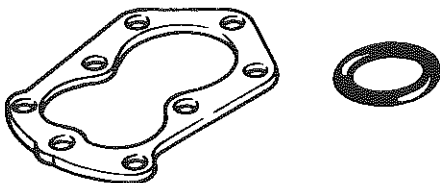
3. Oil, grease and sealers

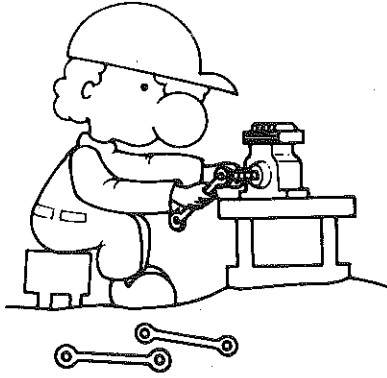
Be sure to use genuine Yamaha oils, grease and sealers, or the equivalents.



4. Expendable parts

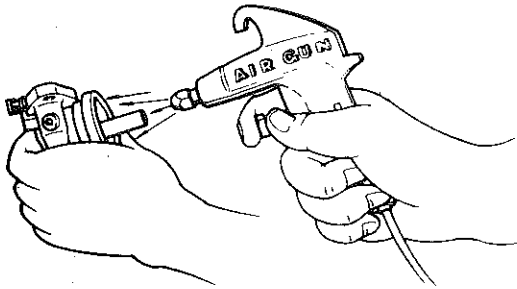
When servicing the engine, always replace the gaskets, O-rings, cotter pins and circlips with new parts.





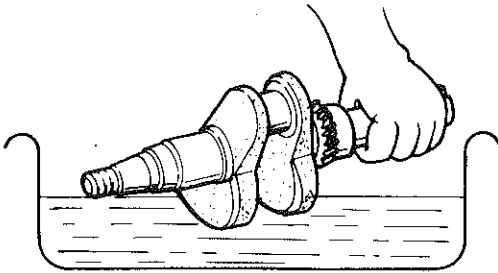
5. Tightening torque

Be sure to follow torque specifications. When tightening bolts, nuts or screws, start with the largest-diameter fastener and work from an inner position to an outer position in a crisscross pattern.



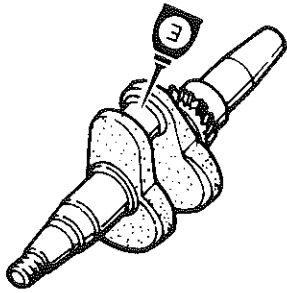
6. Notes on disassembly and assembly

a. After disassembly, parts should be cleaned in solvent and blown dry with compressed air.



Solvent

b. When reassembling moving parts oil their contact surfaces.



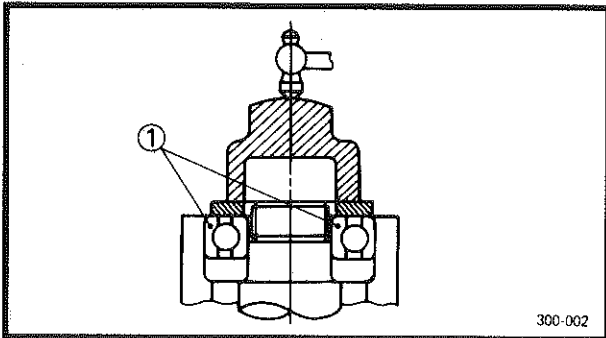
c. Make sure that parts move smoothly after each section of the machine is assembled.

ALL REPLACEMENT PARTS

1. We recommend the use of genuine Yamaha parts for all replacements. Use Oil and/or grease, recommended by Yamaha, for assembly and adjustment.

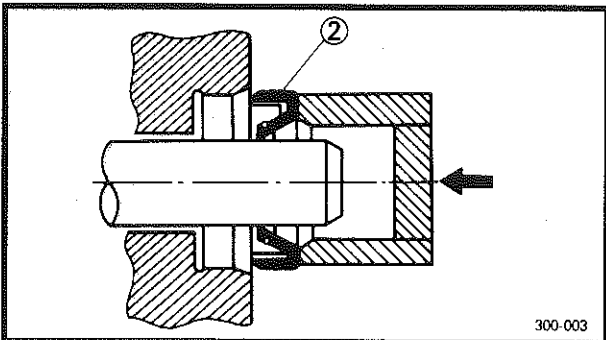
GASKETS, OIL SEALS, AND O-RINGS

1. All gaskets, seals, and O-rings should be replaced when an engine is overhauled. All gasket surfaces, oil seal lips, and O-rings must be cleaned.
2. Properly oil all mating parts and bearings during reassembly. Apply grease to the oil seal lips.



BEARINGS AND OIL SEALS

1. Install the bearing(s) ① and oil seal(s) ② with their manufacturer's marks or numbers facing outward. (In other words, the stamped letters must be on the side exposed to view.) When installing oil seal(s), apply a light coating of light-weight lithium base grease to the seal lip(s). Oil the bearings liberally when installing.

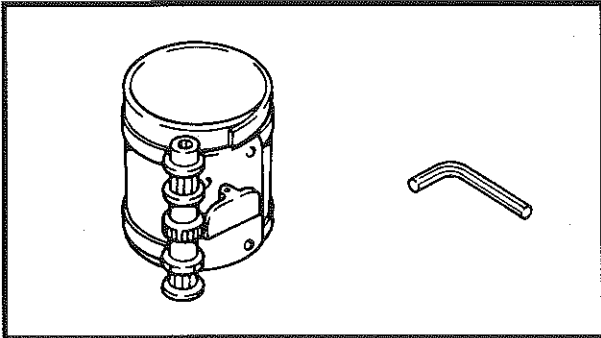


CAUTION:

Do not use compressed air to spin the bearings dry. This causes damage to the bearing surfaces.

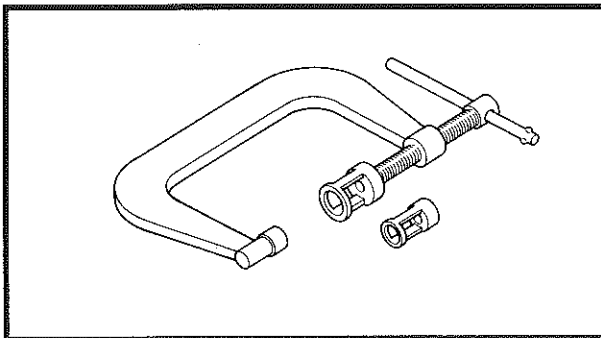
SPECIAL TOOLS AND TESTERS

The proper special tools are necessary for complete and accurate tune-up and assembly. Using the correct special tool will help to prevent the damage caused by the use of improper tools or improvised techniques.



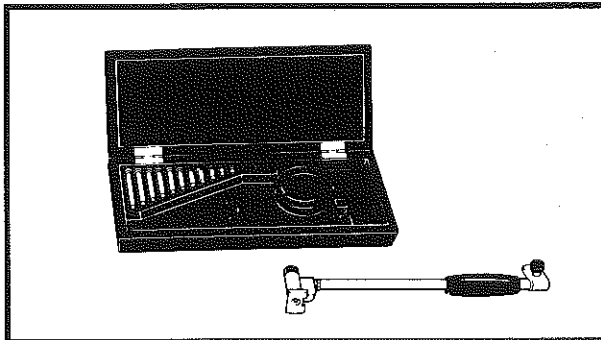
- 1. Piston ring compressor
P/N. YU-33294 (90890-05158)

This tool is used to compress the piston rings when installing the piston.



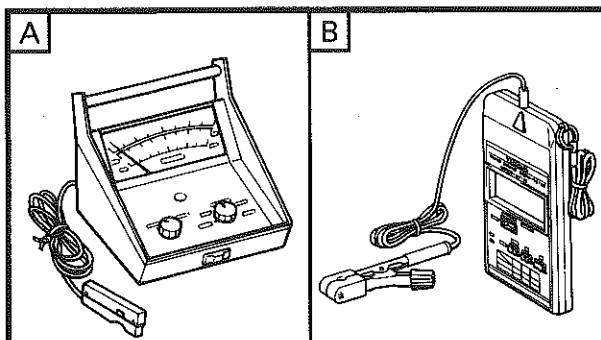
- 2. Valve spring compressor
P/N. YM-01253 (90890-01253)

This tool is used to remove the valve spring.



- 3. Cylinder gauge
P/N 90890-03017
YU-03017 (90890-03017)

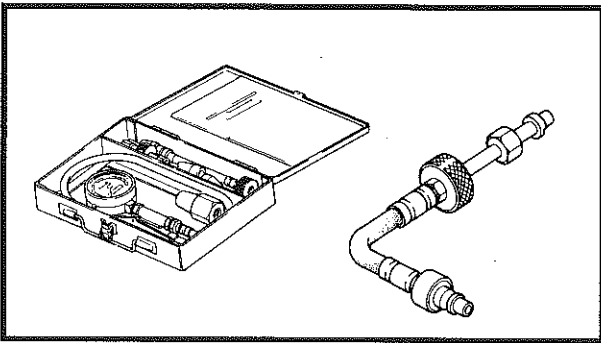
This instrument is used for checking cylinder bore size and condition.



- 4. Inductive tachometer **A**
P/N. YU-8036-A
Tachometer **B**
P/N. 90793-80008

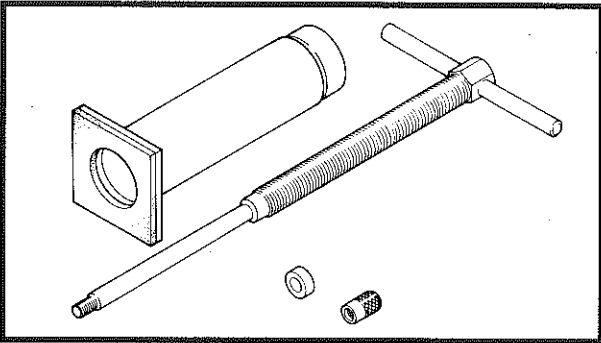
This instrument is used for reading engine rpm.

SPECIAL TOOLS AND TESTERS



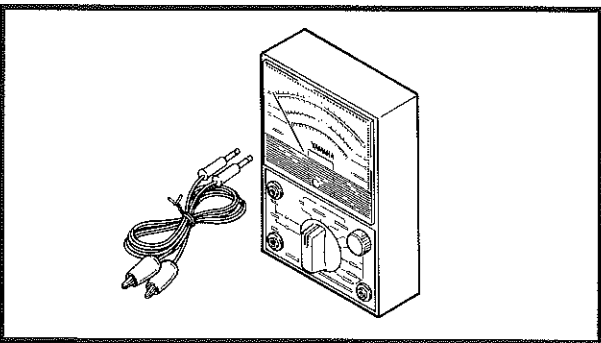
5. Compression gauge set
P/N. YU-33223 (90890-03081)
Adapter
P/N. YU-33223-3 (90890-04082)

This gauge is for checking engine compression.



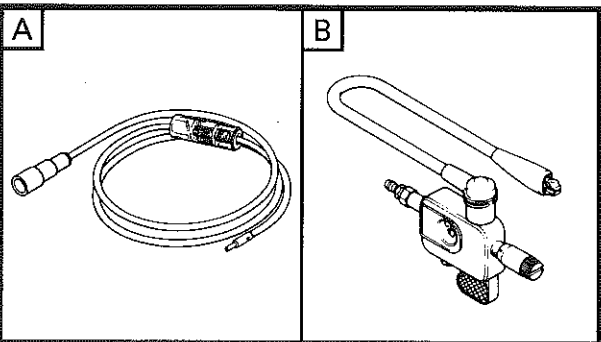
6. Piston pin puller
P/N. YU-01304 (90890-01304)

This tool is used to remove the piston pin.



7. Pocket tester
P/N. YU-03112 (90890-03112)

This instrument is necessary for checking the electrical system.



8. Dynamic spark tester **A**
P/N. YM-34487
Ignition checker **B**
P/N. 90890-06754

This instrument is necessary for checking the ignition system components.



PERIODIC INSPECTIONS AND ADJUSTMENTS

INTRODUCTION

This chapter includes all information necessary to perform recommended inspections and adjustments. These preventive maintenance procedures, if followed, will ensure reliable machine operation and a longer service life. The need for costly overhaul work will be greatly reduced. This information applies to machines already in service as well as to new machines that are being prepared for sale. All service technicians should be familiar with this entire chapter.

MAINTENANCE INTERVALS CHART

Proper periodic maintenance is important: Especially important are the maintenance services related to emissions control. These controls not only function to ensure cleaner air but are also vital to proper engine operation and maximum performance. In the following maintenance tables, the services related to emission controls are indicated as "***" in the chart.

2

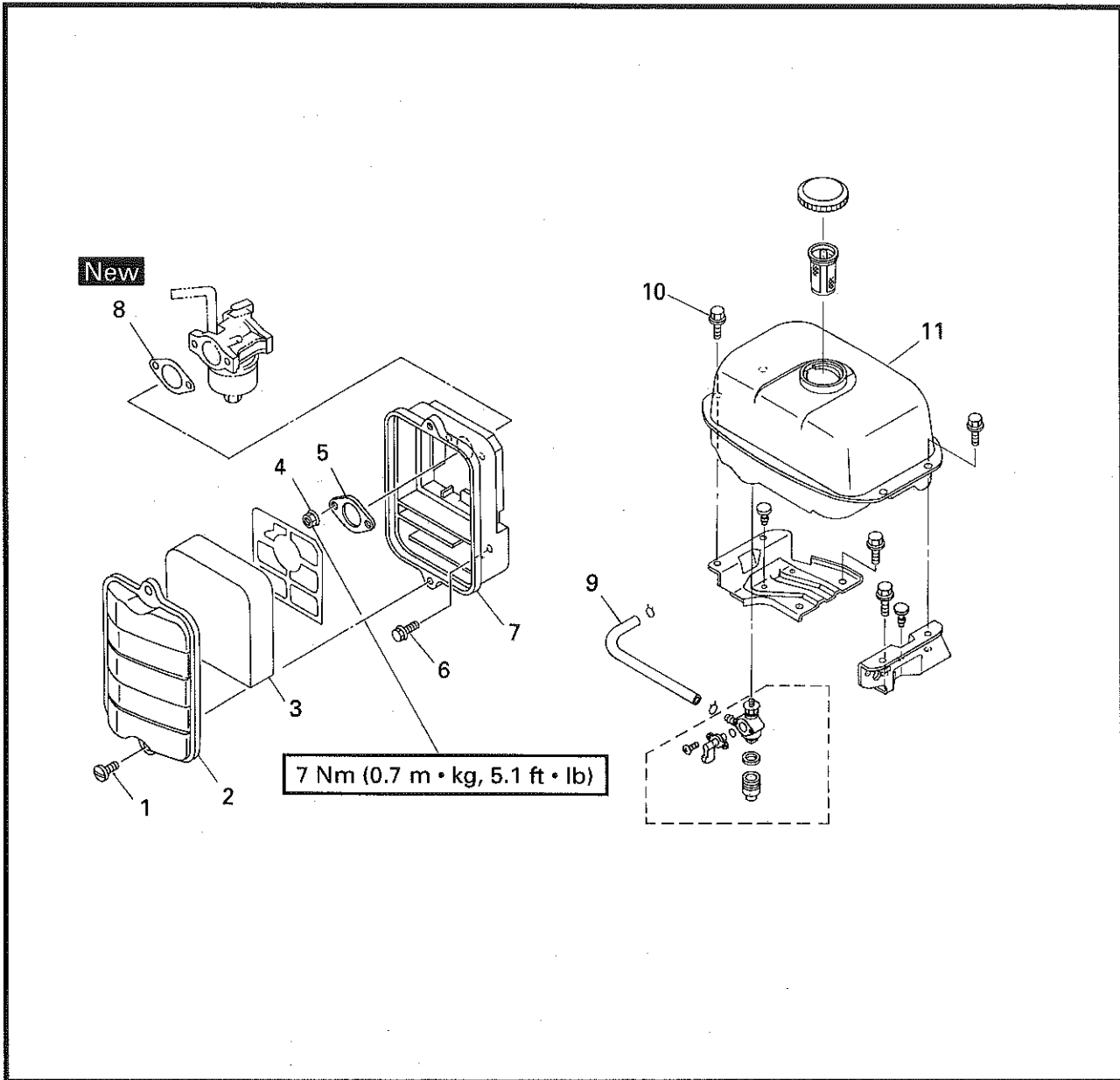
PERIODIC MAINTENANCE/LUBRICATION INTERVALS

No.	Item	Remarks	Pre-Operation check (daily)	Initial	Every		
				1 month or 20 Hr	3 months or 50 Hr	6 months or 100 Hr	12 months or 300 Hr
1.	** Spark plug	Check condition, adjust gap and clean. Replace if necessary.				●	
2.	Engine oil	Check oil level.	●				
		Replace.		●	●		
3.	** Air filter	Clean. Replace if necessary.				●	
4.	Fuel filter	Clean fuel petcock and fuel tank filter. Replace if necessary.				●	
5.*	** Valve clearance	Check and adjust when engine is cold.					●
6.	Fuel line	Check fuel hose for cracks or damage. *Replace if necessary.	●			●	
7.	** Exhaust system	*Check for leakage. Retighten or replace gasket if necessary.	●				●
8.	** Carburetor	Check choke (Control lever) operation.	●			●	
9.*	Cooling system	Check for fan damage.					●
10.	Starting system	Check recoil starter. Operation.	●			●	
11.*	** Decarbonization	More often if necessary.					●
12.	Water pump	Check for leakage. Retighten or replace O-ring and/or gasket.	●				
13.*	Fitting/Fasteners	Check all fitting and fasteners. Correct if necessary.				●	

*It is recommended that these items be serviced by a Yamaha dealer.



AIR FILTER, FUEL TANK

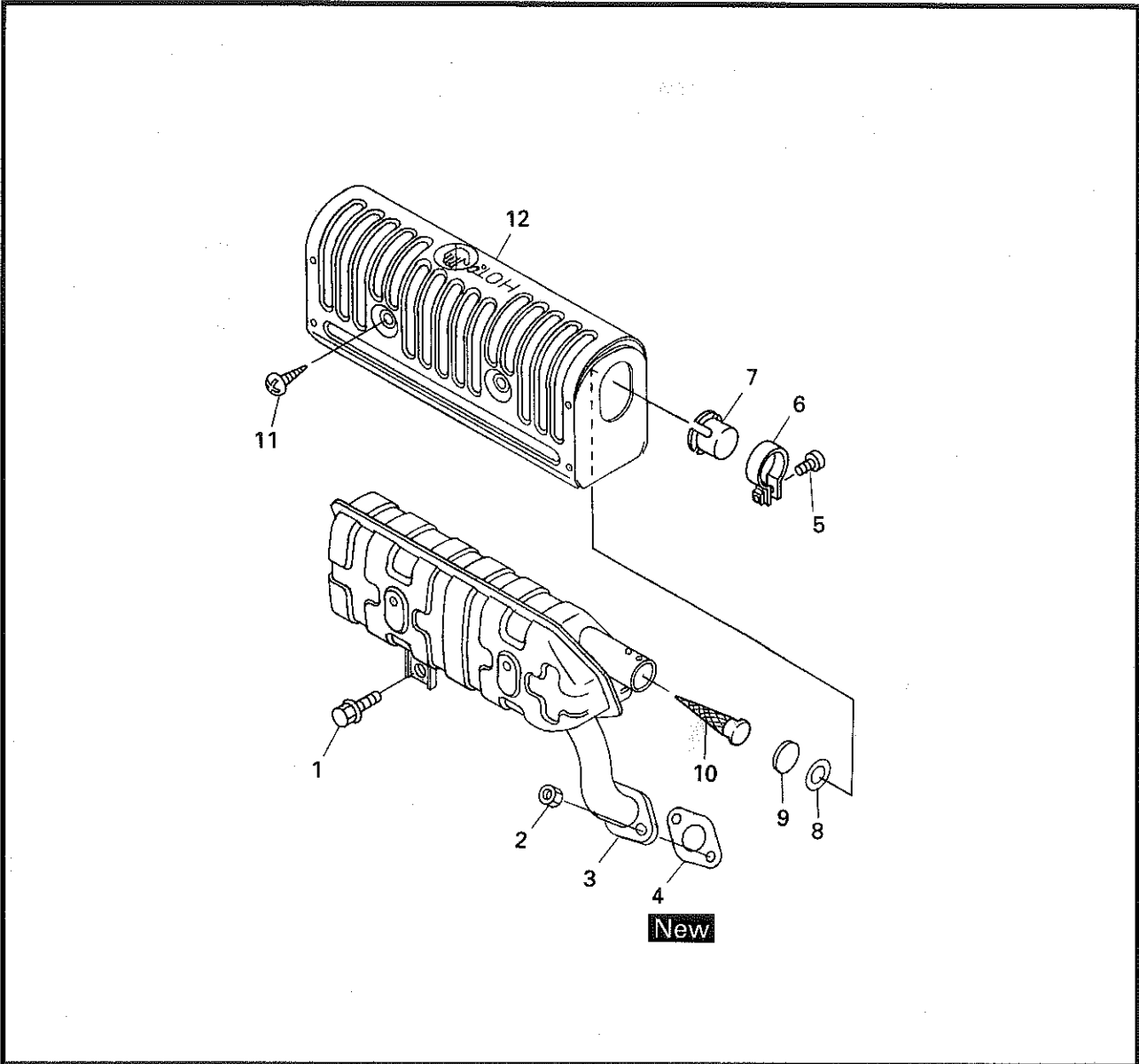


JOB INSTRUCTION CHART

Order	Job name/Parts name	Q'ty	Remarks
	Removal of air filter and fuel tank		Remove the parts in the order below.
1	Screw	2	
2	Air filter cover	1	
3	Air filter element	1	
4	Nut	2	
5	Plate	1	
6	Bolt	1	
7	Air filter case	1	
8	Gasket	1	⚠ WARNING Turn the fuel petcock "OFF".
9	Fuel hose	1	
10	Bolt	4	
11	Fuel tank	1	Reverse the removal procedure for installation.

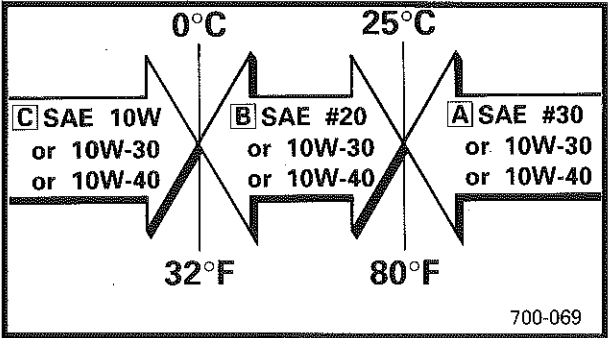


MUFFLER




JOB INSTRUCTION CHART

Order	Job name/Parts name	Q'ty	Remarks
	Removal of muffler		Remove the parts in the order below.
1	Bolt	1	
2	Nut	2	
3	Muffler assembly	1	
4	Metal gasket	1	
5	Screw	1	
6	Retainer band	1	
7	Muffler cup	1	
8	Washer (except for USA)	1	
9	Muffler screen	1	
10	Spark arrester (for USA)	1	
11	Screw	4	
12	Muffler cover	1	
			Reverse the removal procedure for installation.



ENGINE ENGINE OIL



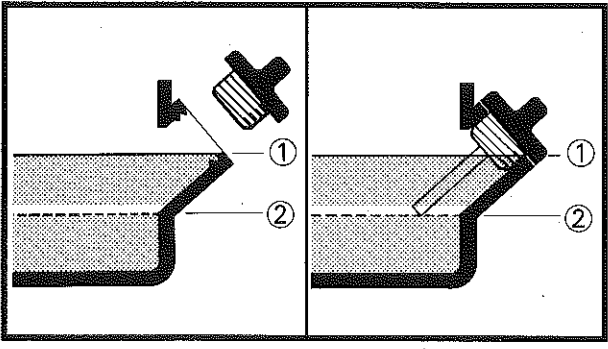
Recommended oil:

- A** SAE #30 or 10W-30 or 10W-40
- B** SAE #20 or 10W-30 or 10W-40
- C** SAE 10W or 10W-30 or 10W-40

Above 35°C (95°F): SAE #40

Engine oil quantity:
0.6L (0.53 Imp qt, 0.63 US qt)

NOTE: Recommended engine oil classification: API Service "SE" or "SF" if not available, "SD".



Oil level measurement

1. Check:
 - Oil level

Oil level measurement steps:

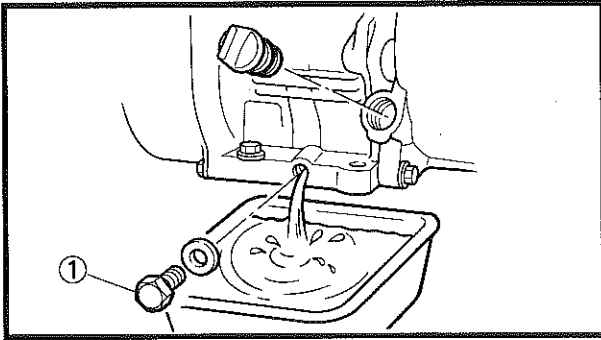
- Place the engine on level ground.
- Warm up the engine for a few minutes.
- Stop the engine.
- Make sure the engine oil is between the upper and lower levels. Add oil as necessary.

- ① Upper level
- ② Lower level

Oil replacement

1. Warm up the engine for several minutes.
2. Place a receptacle under the engine.
3. Remove:
 - Oil filler cap


ENGINE OIL/FUEL LINE INSPECTION/FUEL PETCOCK



4. Remove:
- Drain plug ①
Drain the engine oil.
5. Tighten:
- Drain plug ①

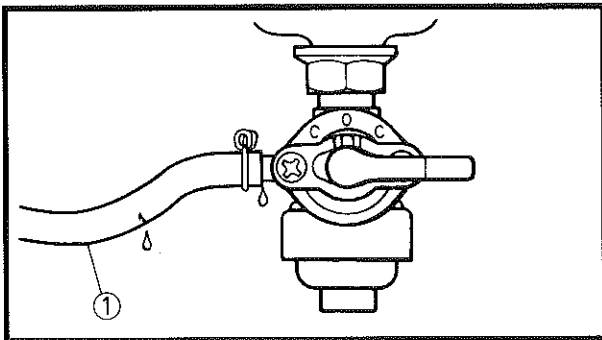
	Oil drain plug: 17 Nm (1.7 m • kg, 12 ft • lb)
---	--

6. Fill:
- Crankcase

	Recommended engine oil: 0.6 L (0.53 Imp qt, 0.63 US qt)
---	---

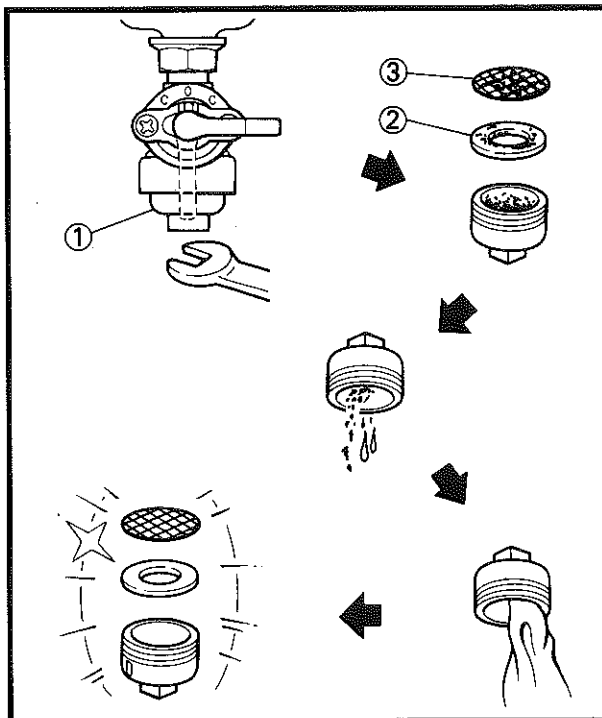
CAUTION:

Do not allow foreign material to enter the crankcase.



FUEL LINE INSPECTION

1. Inspect:
- Fuel hose ①
Cracks/Damage → Replace.
Poor connection → Correct.




FUEL PETCOCK

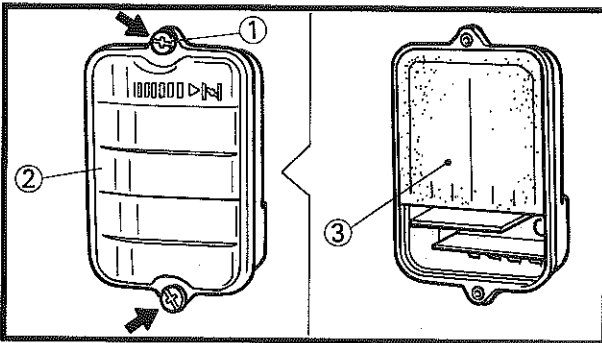
Removal and inspection

1. Turn the fuel petcock lever to "OFF"
2. Inspect:
- Fuel petcock cup ①
Contamination → Clean.
 - Rubber gasket ②
Cracks/Damage → Replace.
 - Metal screen ③
Contamination → Clean.

NOTE:

Clean the cup with solvent and dry it off.

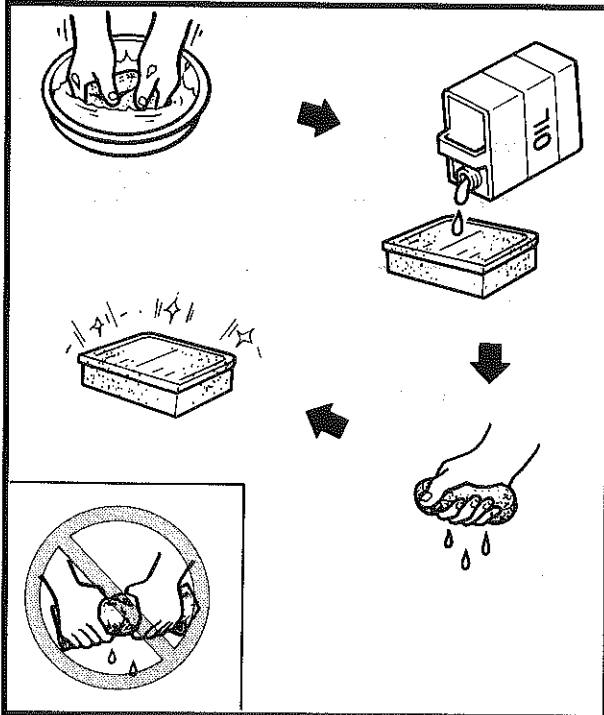
	Fuel petcock cup: 1.5 Nm (0.15 m • kg, 1.1 ft • lb)
---	---



AIR FILTER


1. Remove:

- Bolt ①
- Air filter cover ②
- Air filter element ③



2. Inspect:

- Element
- Clogging → Wash the element in solvent and dry.
Oil the element and squeeze out excess oil.
Damage → Replace.

	<p>Recommended oil: Foam-air-filter oil or SAE #20 motor oil</p>
---	---

3. Install:

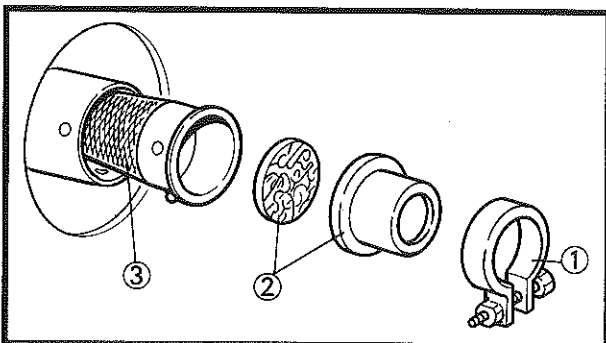
- Air filter element
- Air filter cover

NOTE:

Do not wring out the element; this could cause it to tear.

CAUTION:

The engine should never be run without the element; excessive piston and/or cylinder wear may result.



MUFFLER

1. Remove:

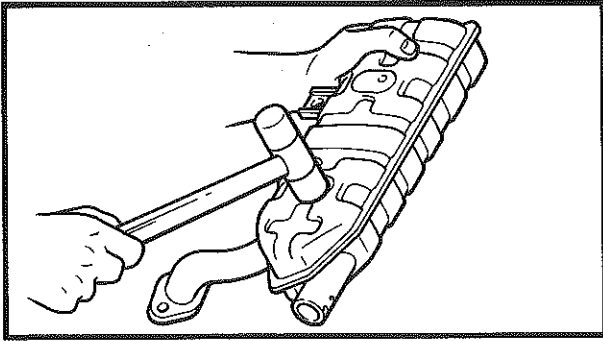
- Muffler
- Refer to "MUFFLER" section.

2. Remove:

- Retainer band ①
- Muffler screen ②
- Spark arrester ③ (for USA)

MUFFLER/VALVE CLEARANCE ADJUSTMENT

INSP
ADJ

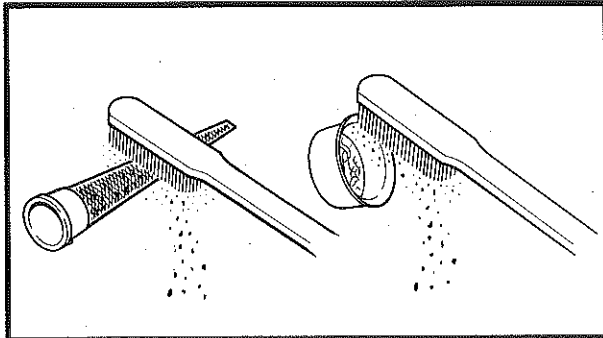


2. Decarbonize:

- Muffler
Tap on the muffler, in the area shown in the illustration, to loosen carbon buildup. Then, shake the carbon pieces out of the end of the muffler.

CAUTION

Do not use a wire to clean the inside the muffler or the noise damping material may come out, reducing the damping effect.

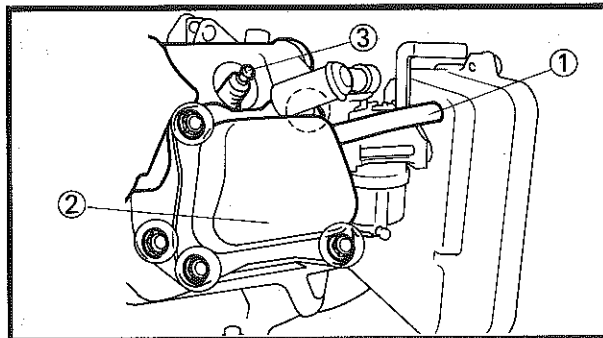


3. Decarbonize:

- Muffler screen
- Spark arrester (for USA)

4. Install:

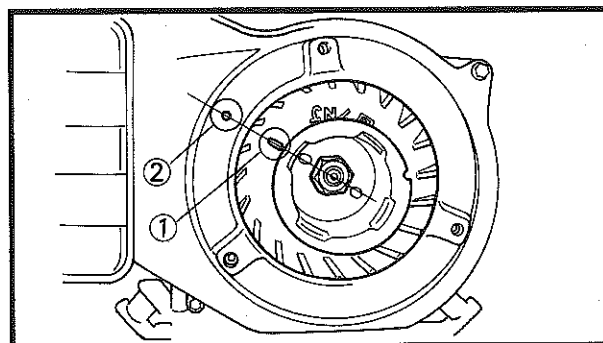
- Metal gasket **New**



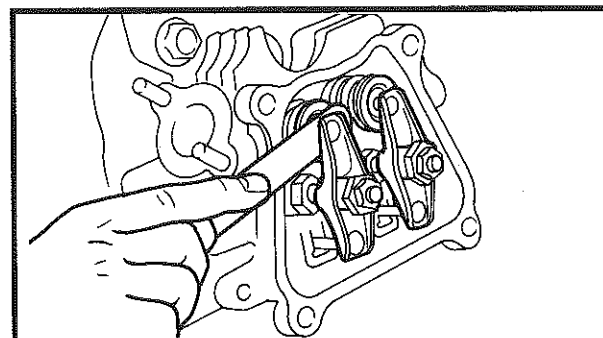
VALVE CLEARANCE ADJUSTMENT

1. Remove:

- Breather hose ①
- Cylinder head cover ②
- Spark plug ③
- Recoil starter




- Turn the crankshaft clockwise until the line ① on the fan is parallel with the stationary dot ②. The piston is then at TDC.



3. Measure:

- Valve clearance
Out of specification → Adjust.

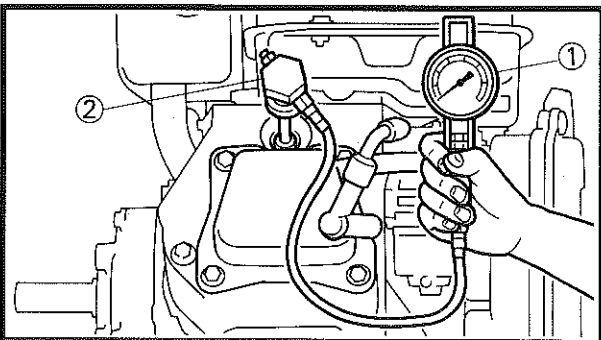
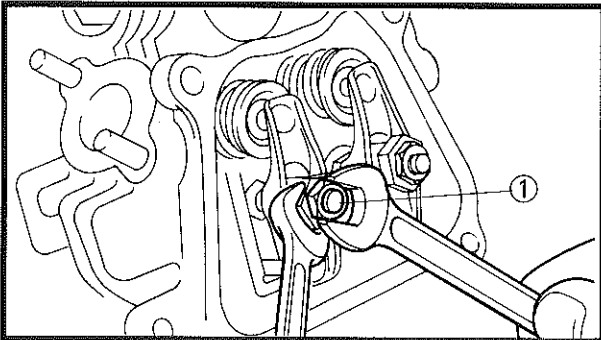
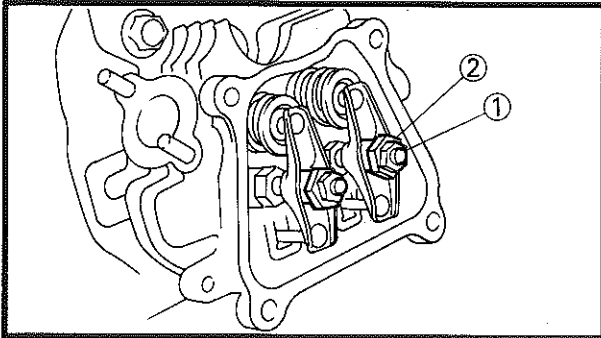
	Intake valve (Cold) (Right)	Exhaust valve (Cold) (Left)
	0.1 mm (0.004 in)	0.1 mm (0.004 in)

VALVE CLEARANCE ADJUSTMENT/ COMPRESSION PRESSURE MEASUREMENT



NOTE:

- When measuring the valve clearance, be sure that the piston is at Top Dead Center (TDC) on the compression stroke.
- Valve clearance must be measured when the engine is cool to the touch.



Valve clearance adjustment

1. Turn the crankshaft until the piston reaches top dead center (T.D.C.).
2. Loosen the locknut ① and insert the 0.1 mm (0.004 in) feeler gauge between the rocker arm and the valve tip.
3. Turn in or out the adjuster ② to obtain the proper valve clearance. Move the feeler gauge up and down to check for the proper resistance.

Adjuster	Resistance	Valve clearance
Turn in	Increase	Decrease
Turn out	Decrease	Increase

4. Tighten the locknut ①.

Adjuster locknut:
10 Nm (1.0 m · kg, 7.2 ft · lb)

COMPRESSION PRESSURE MEASUREMENT

Insufficient compression pressure will result in performance loss and may indicate leaking valves or worn or damaged piston rings.


1. Measure:
 - Valve clearance
2. Warm up the engine for several minutes, then stop the engine.
3. Remove:
 - Spark plug
4. Connect:
 - Compression gauge ①
 - Adapter ②

Compression gauge:
YU-33223, 90890-03081
Adapter:
YU-33223-3, 90890-04082

5. Measure:

- Compression

To measure compression, pull the recoil starter until the needle stops rising on the compression gauge.

	<p>Standard compression pressure: 450 ~ 550 kPa (4.5 ~ 5.5 kg/cm², 64 ~ 78.2 psi)</p>
---	---

⚠ WARNING

When cranking the engine, ground the spark plug wire to prevent sparking.

<p>Compression test steps (below minimum levels):</p> <ul style="list-style-type: none"> • Squirt a few drops of oil into the cylinder. • Measure compression again. 	
Reading	Diagnosis
If higher than without oil	<ul style="list-style-type: none"> • Worn cylinder, piston and piston ring
If the same as without oil	<ul style="list-style-type: none"> • Defective piston, ring(s), valve(s) and cylinder head gasket • Improper valve timing and valve clearance
<p>Compression test steps (above maximum levels):</p> <ul style="list-style-type: none"> • Check cylinder head, valve surfaces, or piston crown for carbon deposits. 	

CYLINDER HEAD DECARBONIZATION

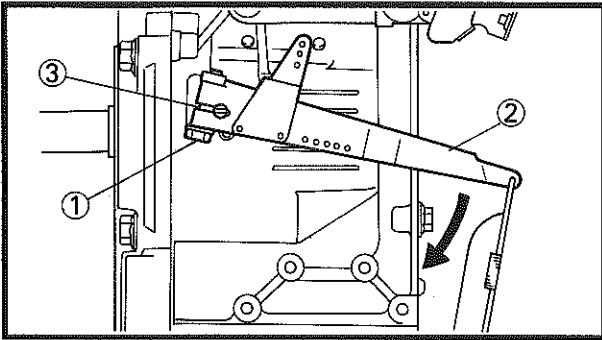
1. Remove:

- Carbon deposits

Refer to "CYLINDER HEAD INSPECTION" section in CHAPTER 4.

GOVERNOR ADJUSTMENT/ ENGINE SPEED ADJUSTMENT

**INSP
ADJ**



GOVERNOR ADJUSTMENT

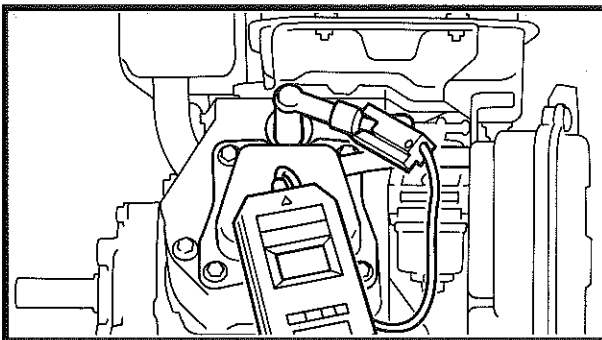
1. Remove:
 - Fuel tank
2. Adjust:
 - Governor

Governor adjustment steps:

1. Loosen the bolt ①.
2. Turn the governor arm ② clockwise until it stops.
3. Turn the governor shaft ③ clockwise until it stops.
4. Tighten the bolt.

3. Adjust:

- Engine speed.
Refer to "ENGINE SPEED ADJUSTMENT" section.



ENGINE SPEED ADJUSTMENT

1. Adjust:
 - Engine speed (with no load)

Engine speed adjustment steps:

1. Install the tachometer onto the spark plug lead.



Inductive tachometer:
YU-8036-A, 90793-80008

2. Warm up the engine for several minutes.
3. Loosen the throttle stop screw ①.
4. Adjust the high speed engine idle by turning the throttle lever ②.

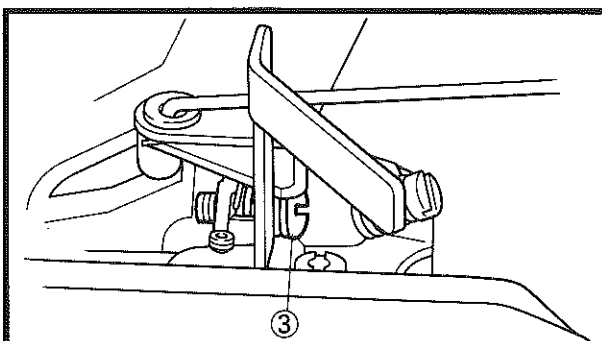
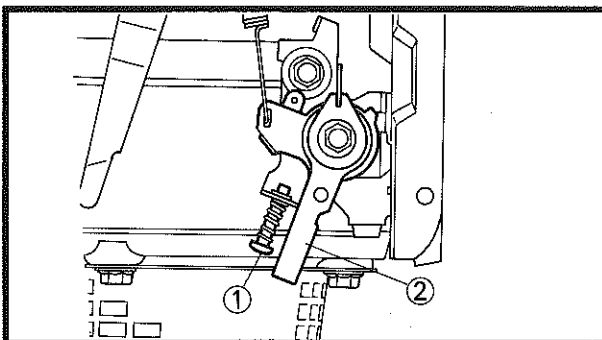


High speed engine idle:
 $4,000 \pm 50$ r/min

5. Tighten the throttle stop screw ① until it stops.
6. Turn the throttle lever ② clockwise until it stops.
7. Adjust the low speed engine idle by turning the throttle stop screw ③, on the carburetor.

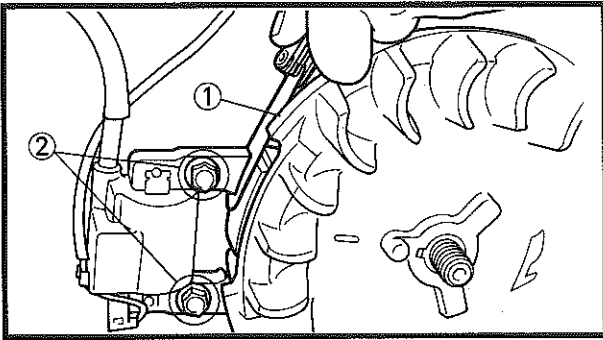


Low speed engine idle:
 $2,000 \pm 100$ r/min



T.C.I. AIR GAP/ BREATHER HOSE INSPECTION/SPARK PLUG

INSP
ADJ



T.C.I. AIR GAP

1. Remove:
 - Fuel tank
 - Air filter
 - Carburetor
 - Recoil starter
 - Fan cover
2. Measure:
 - T.C.I. air gap
 Use feeler gauge ①.
 Incorrect → Adjust.

T.C.I. air gap adjustment steps:

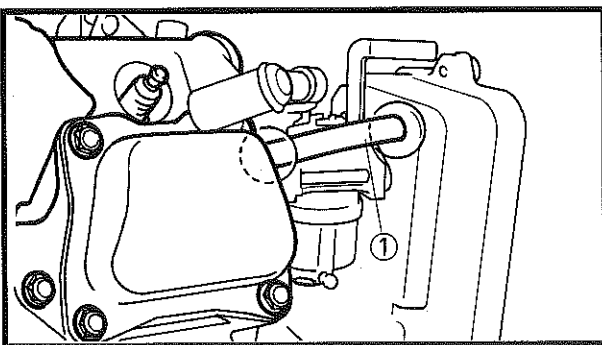
1. Loosen the bolts ②.
2. Adjust the T.C.I. air gap between the T.C.I. pulser and the flywheel by moving the T.C.I. unit up or down.
3. Tighten the bolts.



10 Nm (1.0 m • kg, 7.2 ft • lb)



T.C.I. air gap:
0.5 mm (0.0197 in)



BREATHER HOSE INSPECTION

1. Inspect:
 - Breather hose ①
 Cracks/Damage → Replace.
 Poor connection → Correct.

SPARK PLUG

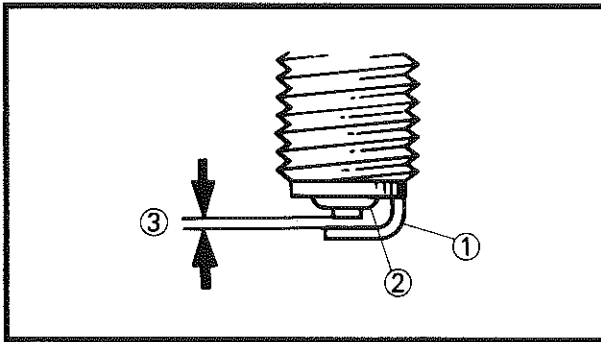
1. Remove:
 - Spark plug

CAUTION

Before removing the spark plug, use compressed air to clean the cylinder head cover to prevent dirt from falling into the engine.

SPARK PLUG/ CRANKSHAFT SIDE CLEARANCE ADJUSTMENT

**INSP
ADJ**



2. Inspect:

- Electrode ①
Wear/Damage → Replace.
- Insulator color ②

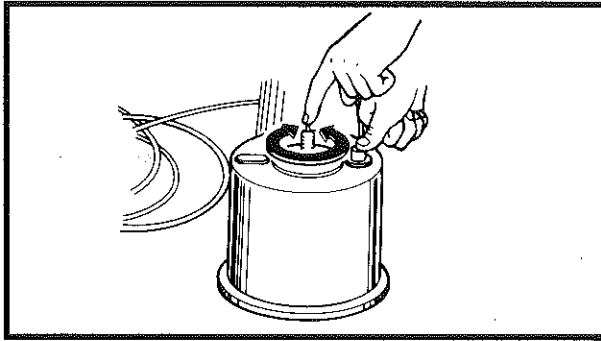
3. Measure:

- Plug gap ③
Use a wire gauge or feeler gauge.
Out of specification → Regap.



Spark plug gap:
0.7 ~ 0.8 mm (0.028 ~ 0.031 in)

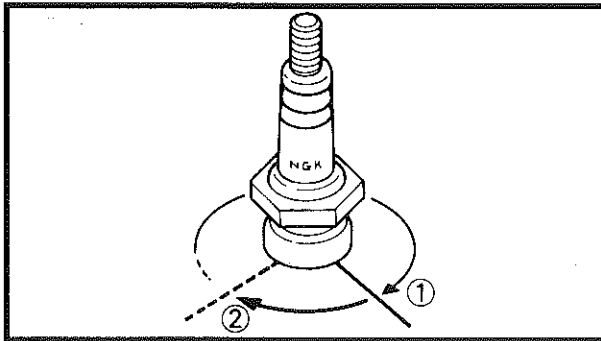
If necessary, clean the spark plug with a spark plug cleaner.



Standard spark plug:

Spark plug (without resistor): BPR4ES

Before installing a spark plug, clean the gas-ket surface and plug surface.



4. Tighten:

- Spark plug



Spark plug:
18 Nm (1.8 m · kg, 13 ft · lb)

NOTE:

Finger tighten ① the spark plug before torquing ②, to prevent thread damage.

CRANKSHAFT SIDE CLEARANCE ADJUSTMENT

1. Remove:

- Pump assembly

2. Measure:

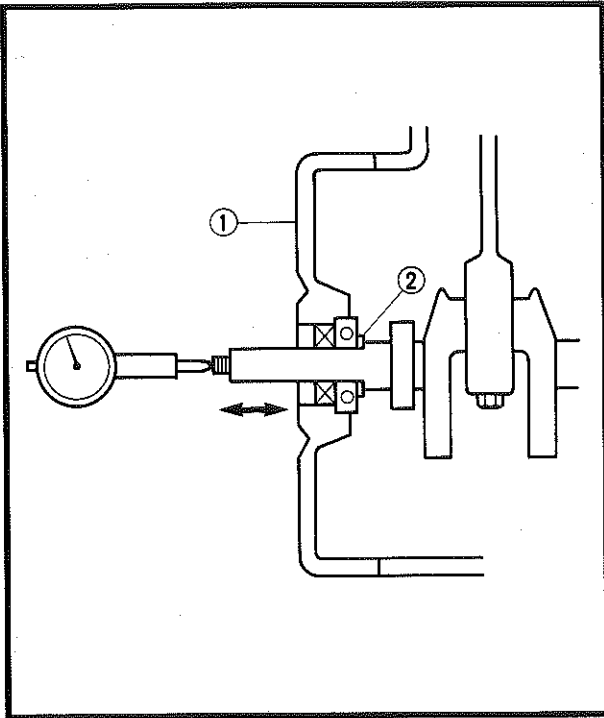
- Crankshaft side clearance
Use dial gauge.
Incorrect → Adjust



**Standard crankshaft side
clearance:**
0 ~ 0.2 mm (0 ~ 0.0079 in)

CRANKSHAFT SIDE CLEARANCE ADJUSTMENT/ IMPELLER GAP ADJUSTMENT

**INSP
ADJ**



Crankshaft side clearance adjustment steps:

1. Remove the crankcase cover ①.
2. Add or subtract the shim ②.

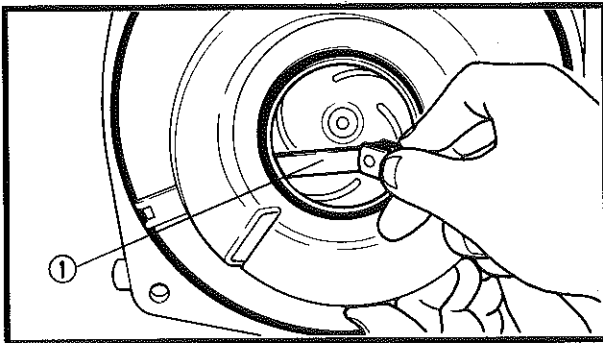
Model	YP20G/30G
Shim size	0.1 mm (0.0039 in)
	0.2 mm (0.0079 in)
	0.3 mm (0.0118 in)

3. Install the crankcase cover.



Crankcase cover bolts:
YP20G/30G
22 Nm (2.2 m · kg, 16 ft · lb)

4. Recheck the crankshaft side clearance.



PUMP

IMPELLER GAP ADJUSTMENT

1. Remove:
 - Pump case
2. Measure:
 - Impeller gap
 Use feeler gauge ①.
Incorrect → Adjust gap.



Standard impeller gap:

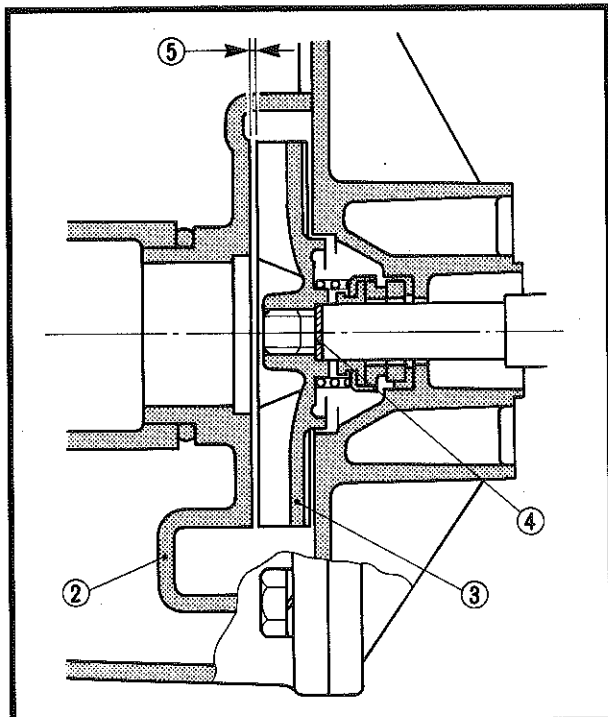
YP20G/30G	0.3 ~ 0.5 mm (0.012 ~ 0.02 in)
------------------	---

Impeller gap adjustment steps:

1. Remove volute casing ② and impeller ③.
2. Add or subtract the adjusting washer ④.
3. Install the impeller and volute casing.

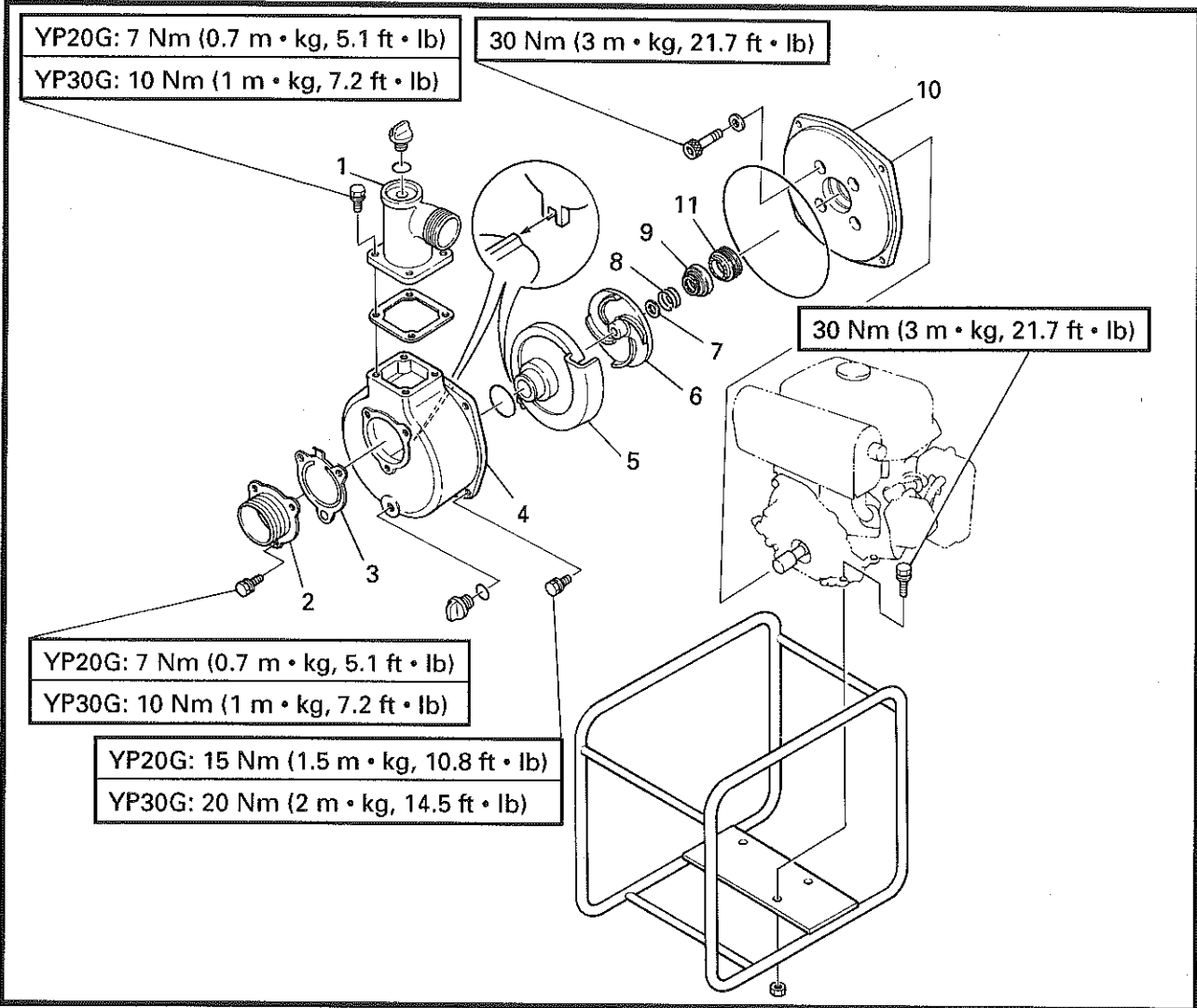
NOTE:

Be sure to securely tighten the impeller.



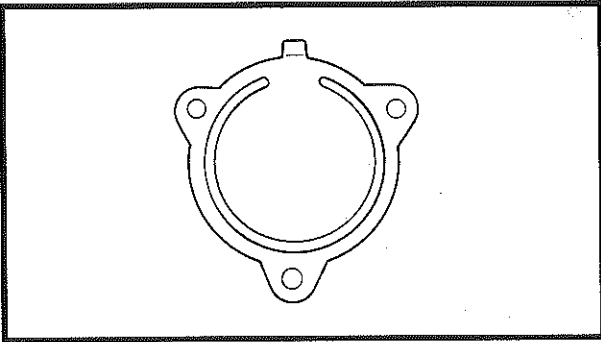


PUMP



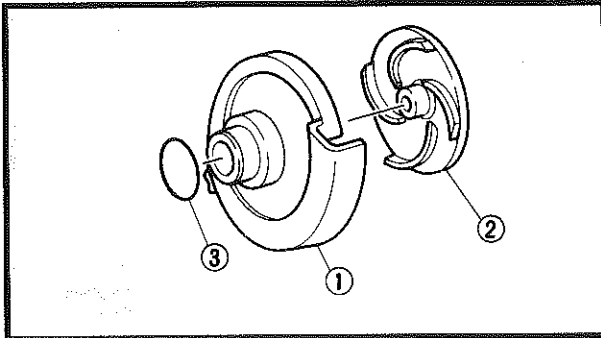
JOB INSTRUCTION CHART

Order	Job name/Parts name	Q'ty	Remarks
	Removal of the pump		Remove the parts in the order below.
1	Delivery bend	1	
2	Suction cover	1	
3	Check valve	1	
4	Pump case 1	1	
5	Volute case	1	
6	Impeller	1	Mesh the pump case projection with the volute case slot. Turn the impeller counterclockwise by tapping the outer edge of the impeller with a plastic hammer.
7	Adjusting washer		
8	Spring	1	
9	Rotating seal	1	The rotating seal collar must be removed prior to the rotating seal.
10	Pump case 2	1	The cut-out section of pump case 2 faces down.
11	Fixed seal set	1	Reverse the removal procedure for installation.



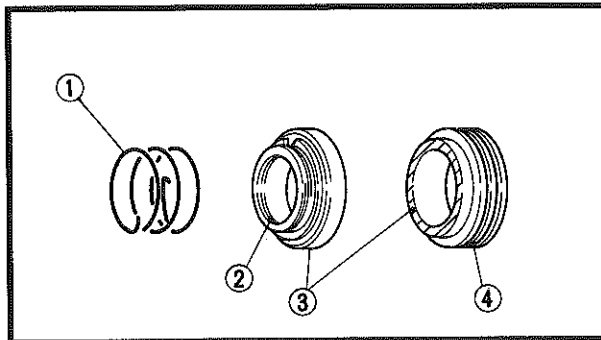
CHECK VALVE INSPECTION

1. Inspect:
- Check valve
Cracks/Wear/Damage → Replace



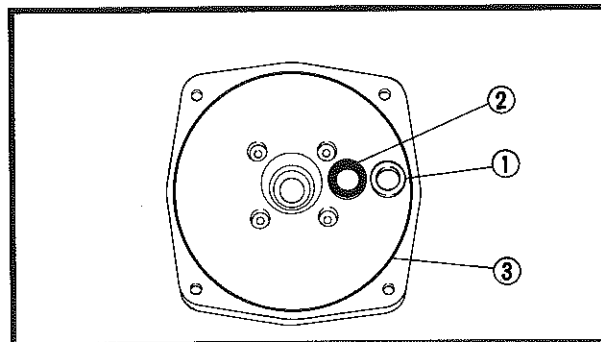
VOLUTE CASE/IMPELLER

1. Inspect:
- Volute case ①
 - Impeller ②
 - O-ring ③
Cracks/Wear/Damage → Replace

3


MECHANICAL SEAL SET

1. Inspect:
- Spring ①
 - Inner circumference of rubber lip ②
 - Friction surface ③
 - Outer circumference of buffer rubber ④
Cracks/Wear/Damage → Replace



FIXED SEAL SET

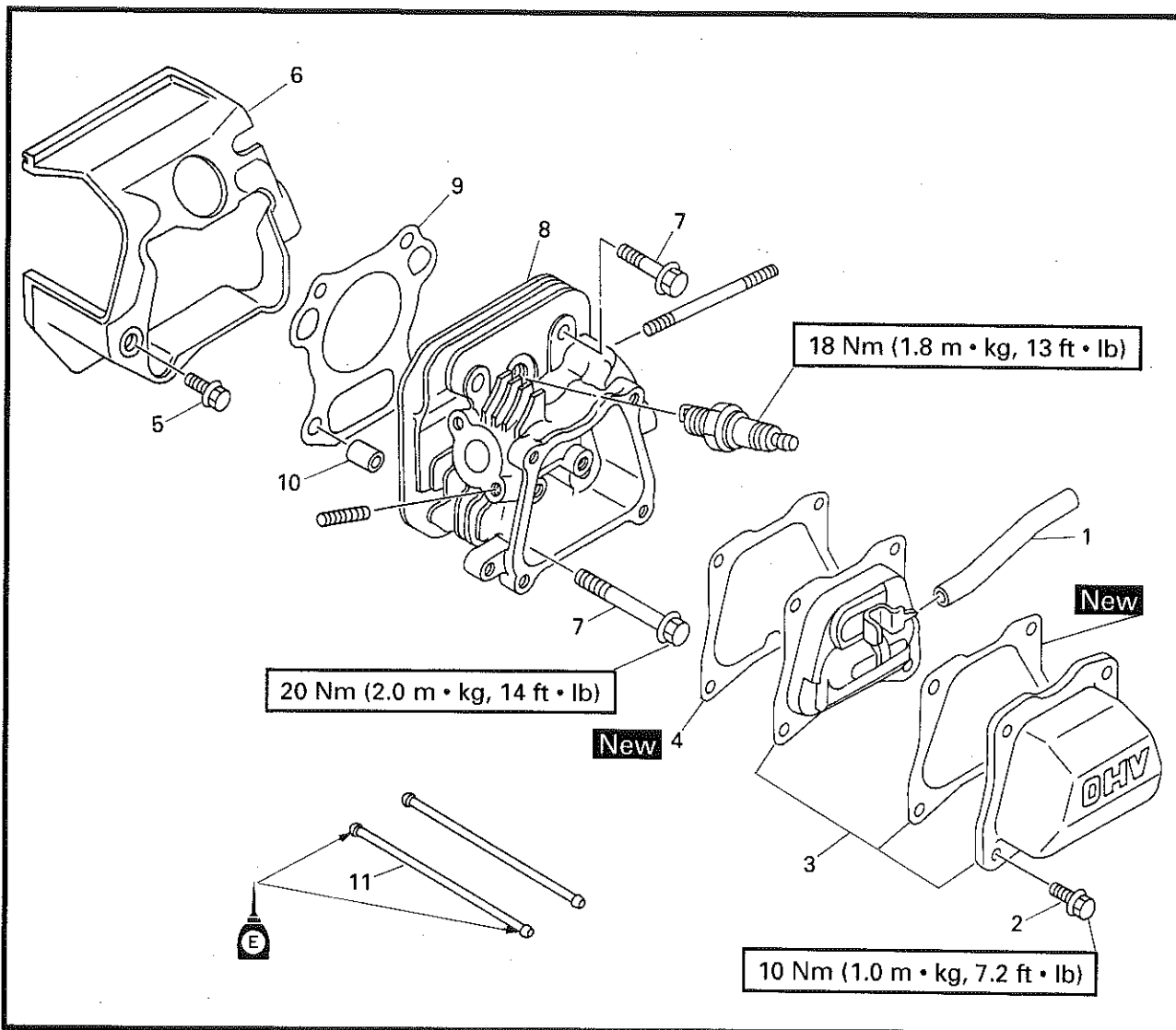
1. Inspect:
- Seal ①
 - Damper rubber ②
 - O-ring ③
Cracks/Wear/Damage → Replace

INSTALLATION

1. Adjust:
- Impeller gap.
Refer to the "IMPELLER GAP ADJUSTMENT" section in CHAPTER 2.

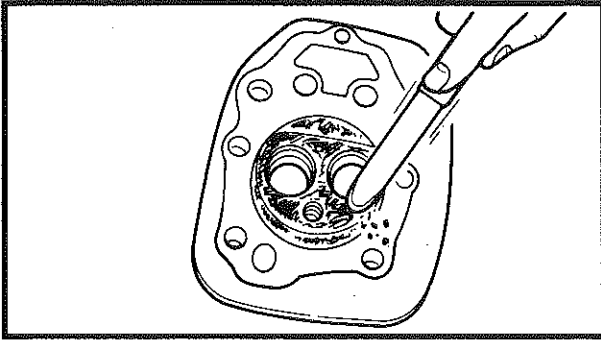


CYLINDER HEAD COVER, CYLINDER HEAD



JOB INSTRUCTION CHART

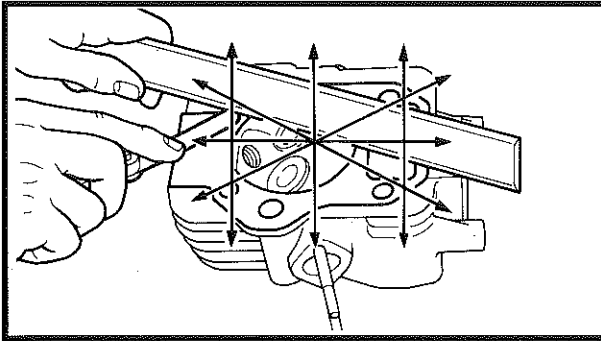
Order	Job name/Parts name	Q'ty	Remarks
	Removal of cylinder head cover and cylinder head		Remove the parts in the order below.
	Air filter, carburetor		Refer to "AIR FILTER, CARBURETOR" section.
	Muffler		Refer to "MUFFLER" section.
1	Breather hose	1	
2	Bolt	4	
3	Cylinder head cover	1	
4	Gasket	1	
5	Bolt	1	
6	Air shroud	1	
7	Bolt	4	
8	Cylinder head	1	
9	Gasket	1	
10	Dowel pin	2	
11	Push rod	2	
			Reverse the removal procedure for installation.



CYLINDER HEAD INSPECTION

1. Remove:

- Carbon deposits
Use rounded scraper.

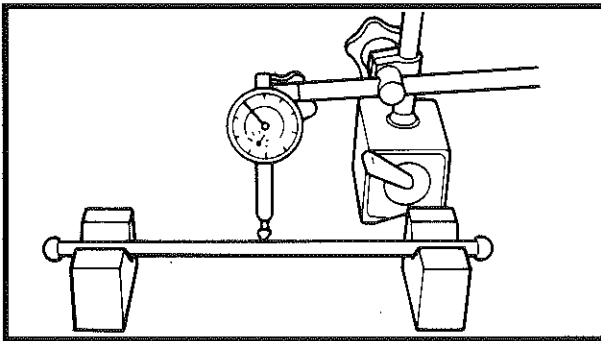


2. Measure:

- Cylinder head warpage
Exceeds allowable limit → Re-surface.



Warpage limit:
0.1 mm (0.004 in)



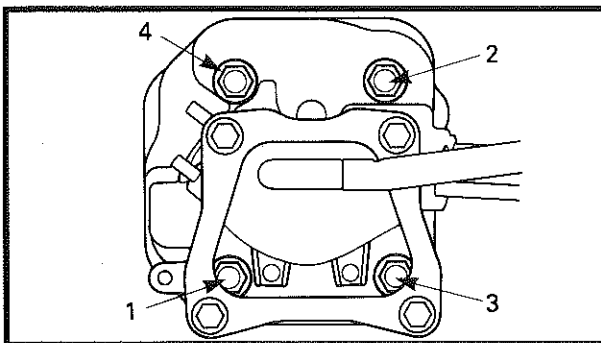
PUSH LOD INSPECTION

1. Measure:

- Push rod runout
Roll on V-block
Exceeds runout limit → Replace.



Runout limit:
0.5 mm (0.02 in)



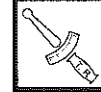
CYLINDER HEAD INSTALLATION

1. Install:

- Gasket **New**
- Cylinder head assembly

NOTE:

Follow proper tightening sequence.



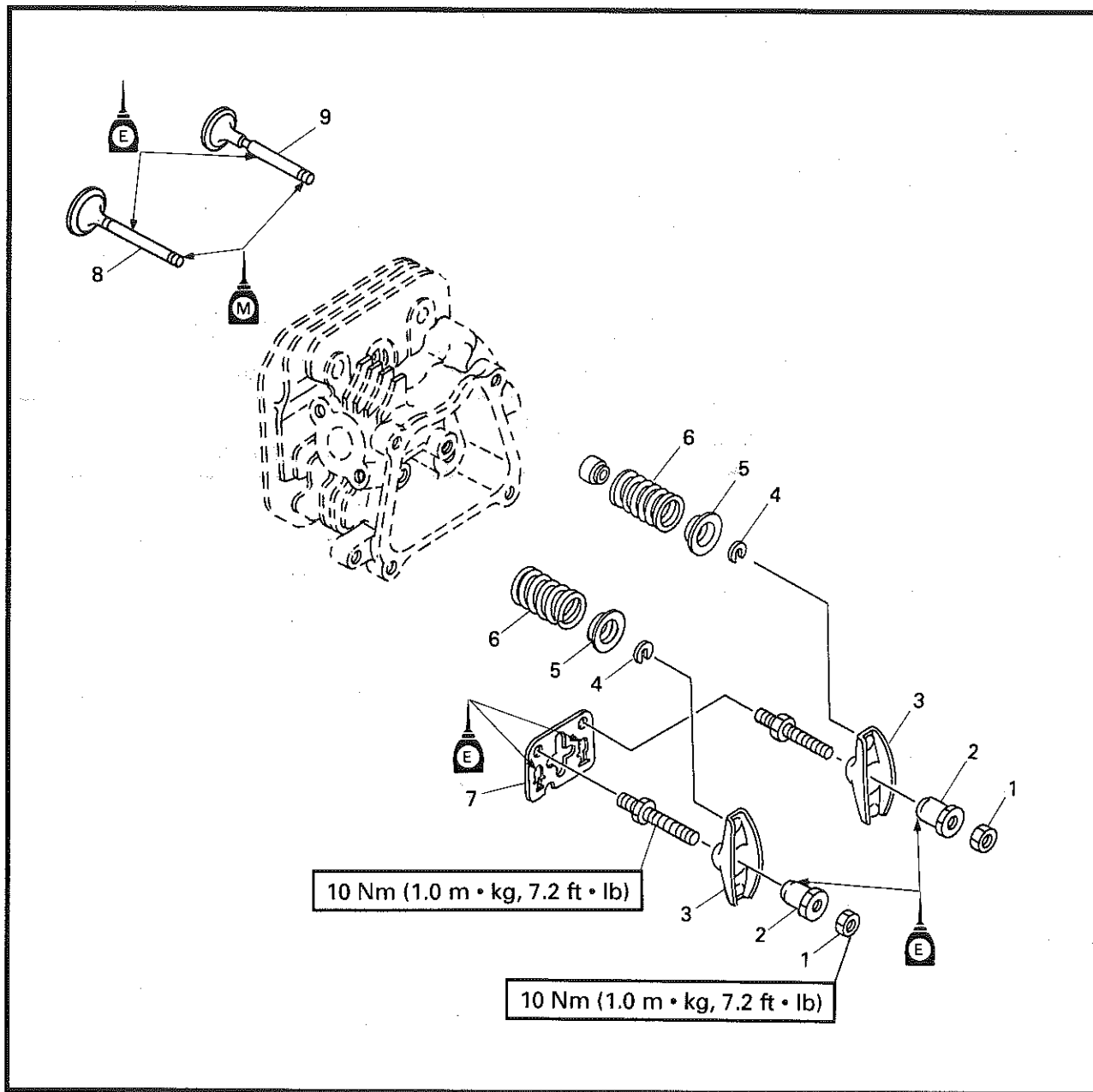
Cylinder head bolt:
20 Nm (2.0 m · kg, 14 ft · lb)

2. Adjust:

- Valve clearance
Refer to the "VALVE CLEARANCE ADJUSTMENT" section in CHAPTER 2.

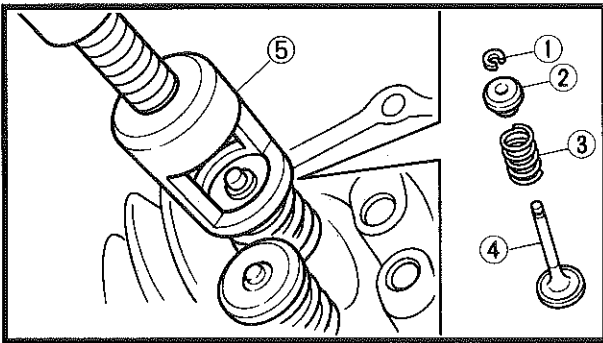


VALVE



JOB INSTRUCTION CHART

Order	Job name/Parts name	Q'ty	Remarks
	Removal of valve		
	Cylinder head		Remove the parts in the order below. Refer to "CYLINDER HEAD" section.
1	Locknut	2	
2	Adjuster	2	
3	Rocker arm	2	
4	Valve cotter	2	
5	Valve spring retainer	2	
6	Valve spring	2	
7	Push rod guide	1	
8	Exhaust valve	1	
9	Intake valve	1	
			Reverse the removal procedure for installation.



VALVE REMOVAL

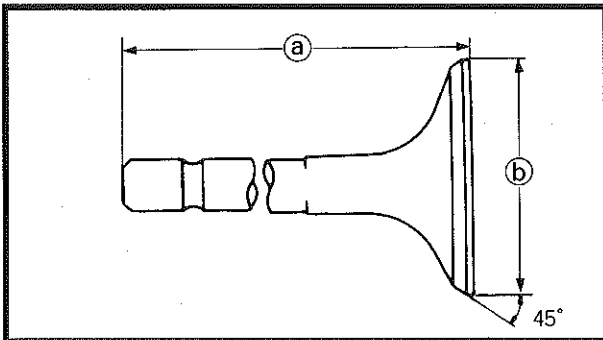
1. Remove:

- Valve cotter ①
- Valve spring retainer ②
- Valve spring ③
- Valve ④

Use a valve spring compressor ⑤.



Valve spring compressor:
YM-01253, 90890-01253



VALVE INSPECTION

1. Inspect:

- Valve length ①
- Valve face diameter ②

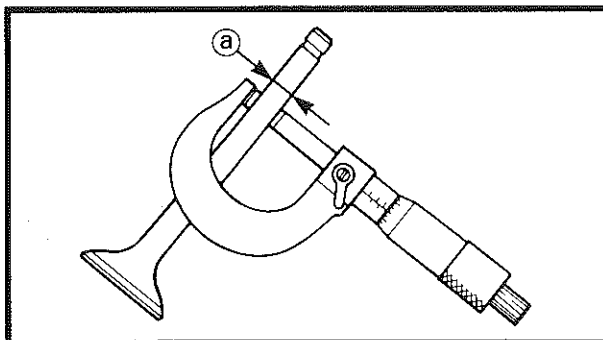


Valve length:

Intake :YP20G	64.5 mm (2.54 in)
:YP30G	65.9 mm (2.59 in)
Exhaust :YP20G	64.5 mm (2.54 in)
:YP30G	65.9 mm (2.59 in)

Valve face diameter:

Intake :YP20G	21.0 mm (0.83 in)
:YP30G	24.0 mm (0.94 in)
Exhaust :YP20G	19.0 mm (0.75 in)
:YP30G	22.0 mm (0.87 in)



2. Inspect:

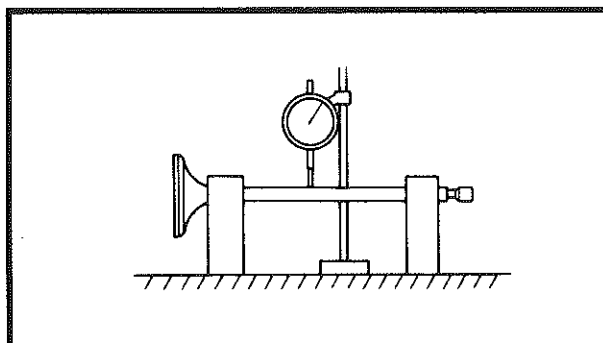
- Valve stem diameter ①



Valve stem diameter:

Standard	
Intake: 5.5 mm (0.22 in)	
Exhaust: 5.5 mm (0.22 in)	

Out of specification → Replace.



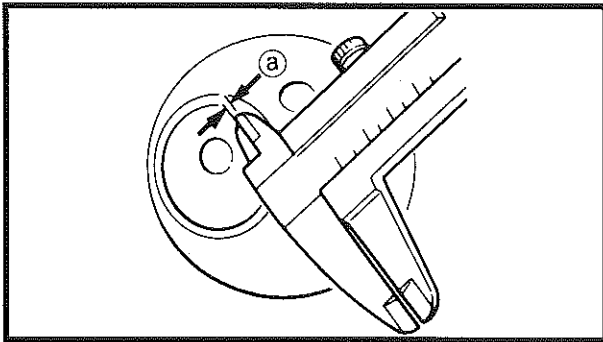
3. Measure:

- Valve stem runout



Valve stem runout limit:
0.01 mm (0.0004 in)

Out of specification → Replace.



VALVE SEAT INSPECTION

1. Measure:

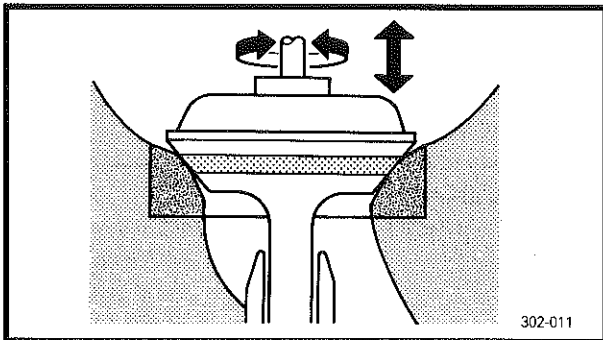
- Valve seat width Ⓐ
- Poor seating → Lap
- Out of specification → Replace.



Valve seat width:

Standard: 0.7 mm (0.03 in)

Limit: 1.7 mm (0.067 in)



Valve/Valve seat assembly lapping

1. Apply:

- Coarse lapping compound (small amount to the valve face)

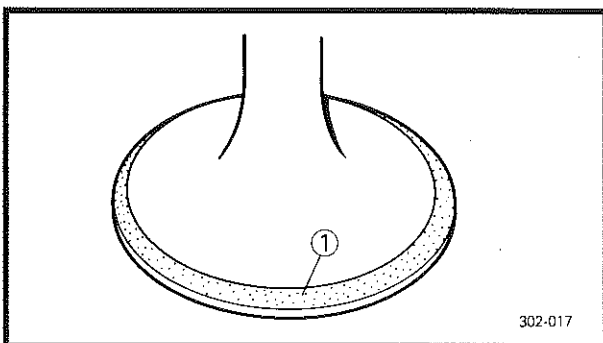
2. Position:

- Valve (in cylinder head)

3. Rotate:

- Valve
- Turn until valve and valve seat are evenly polished, then clean off compound.

- 4. Repeat the above steps with a fine compound and continue lapping until the valve face has a completely smooth surface.



5. Remove:

- Compound (from valve face)

6. Apply:

- Mechanic's bluing dye (dykem) ① (to valve face and seat)

7. Rotate:

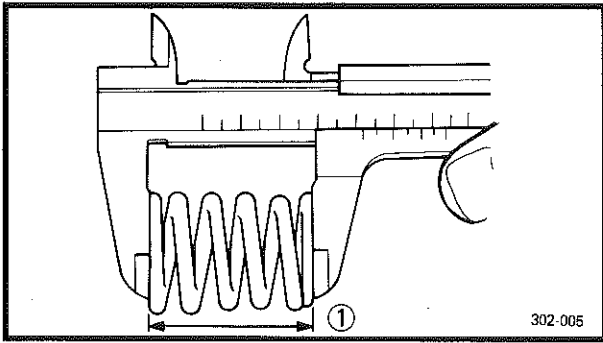
- Valve
- Valve must make full seat contact indicated by grey surface all around the valve face where the bluing was removed.

8. Apply:

- Solvent (into each intake and exhaust port)
- Leakage past valve seat → Repeat valve lapping until seal is complete.

NOTE:

Pour solvent into intake and exhaust ports only after completion of all valve work and assembly of head parts.



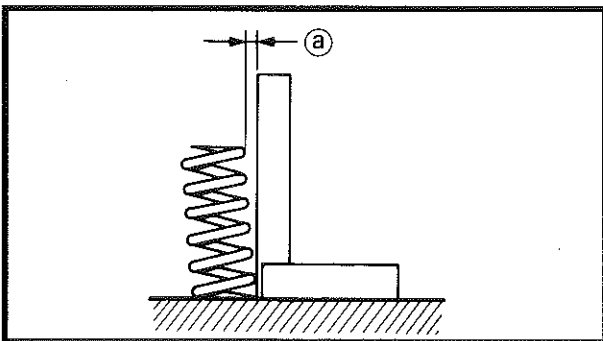
Valve spring measurement

1. Measure:

- Valve spring free length ①
Out of specification → Replace.



Valve spring free length:
26.5 mm (1.04 in)
Limit:
25.0 mm (0.98 in)



2. Measure:

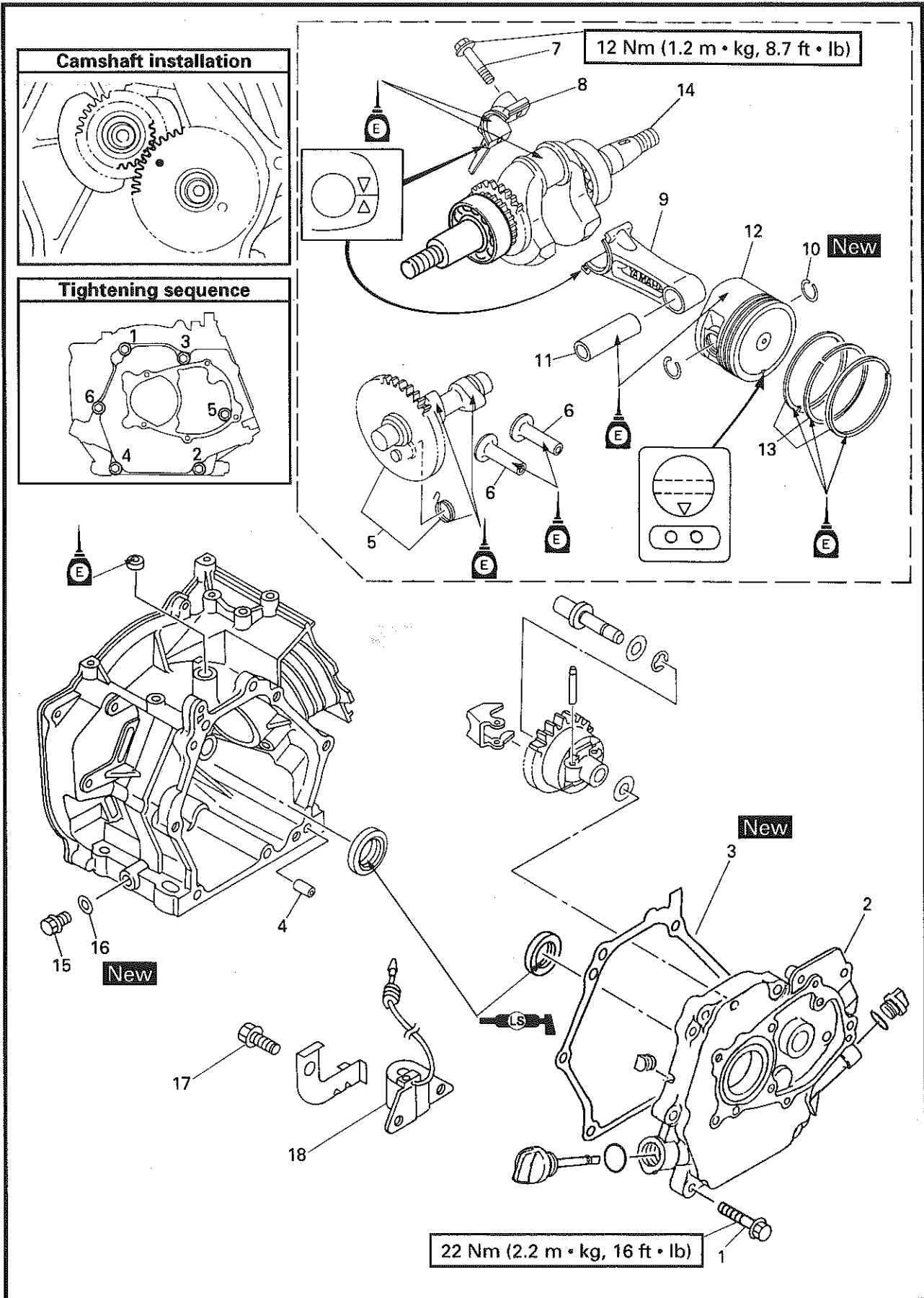
- Valve spring tilt ②
Use a square.
Out of specification → Replace.



Tilt limit:
1.0 mm (0.04 in)



PISTON, CAMSHAFT, CRANKCASE, CRANKSHAFT



PISTON, CAMSHAFT, CRANKCASE, CRANKSHAFT

ENG

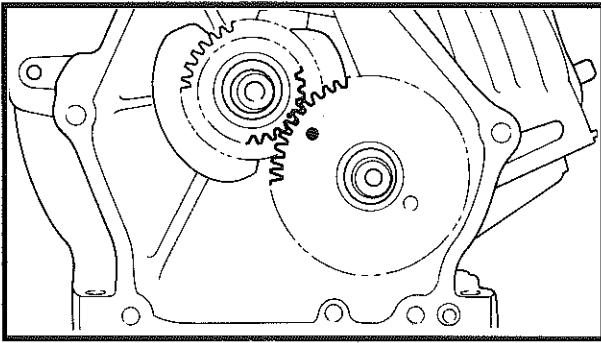


JOB INSTRUCTION CHART

Order	Job name/Parts name	Q'ty	Remarks
	Removal of piston, camshaft crankcase and crankshaft		Remove the parts in the order below. Refer to the "CYLINDER HEAD COVER, CYLINDER HEAD" section.
	Cylinder head		Refer to the "FLYWHEEL" section.
	Flywheel		
1	Bolt	6	NOTE: Follow proper tightening sequence.
2	Crankcase cover	1	
3	Gasket	1	
4	Dowel pin	2	
5	Camshaft	1	NOTE: Be sure to align the camshaft gear mark with the crankshaft gear mark.
6	Valve lifter	2	
7	Bolt	2	
8	Connecting rod cap	1	NOTE: Be sure the connecting rod mark is aligned with the cap mark.
9	Connecting rod	1	NOTE: Be sure the "YAMAHA" mark on the connecting rod faces to the crankcase cover side.
10	Piston pin circlip	2	
11	Piston pin	1	
12	Piston	1	NOTE: Be sure the "∇" mark on the piston head faces to the push rod side.
13	Piston ring	3	NOTE: Be sure to install the rings so that manufacturer's marks face to the piston head. Be sure each piston ring end is positioned as in the illustration.
14	Crankshaft	1	
15	Drain plug	1	
16	Gasket	1	
17	Bolt	3	
18	Oil level switch	1	
			Reverse the removal procedure for installation.

	Cam lobe length	IN	(a)	26.9 mm (1.06 in)
			(b)	22.0 mm (0.87 in)
		EX	(a)	26.68 mm (1.05 in)
			(b)	22.0 mm (0.87 in)

Piston pin wear limit	15.95 mm (0.63 in)
Crankpin wear limit	27.9 mm (1.098 in)
Crankshaft runout limit	0.04 mm (0.0016 in)

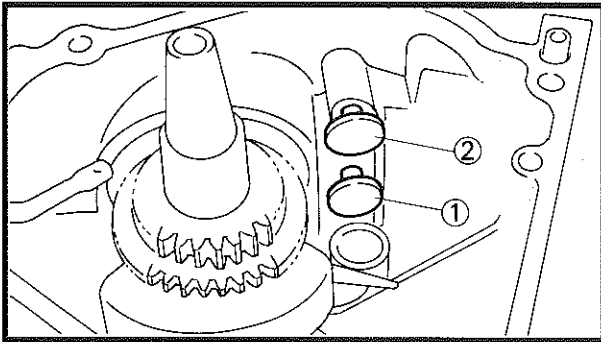


CAMSHAFT REMOVAL

1. Remove:
- Camshaft

NOTE:

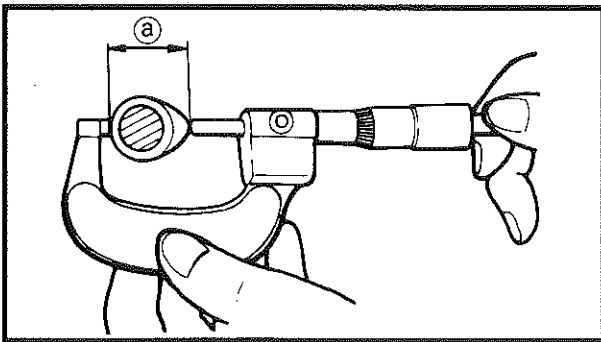
Remove the camshaft when the camshaft gear mark and the crankshaft gear mark are aligned.



2. Remove:
- Intake valve lifter ①
 - Exhaust valve lifter ②

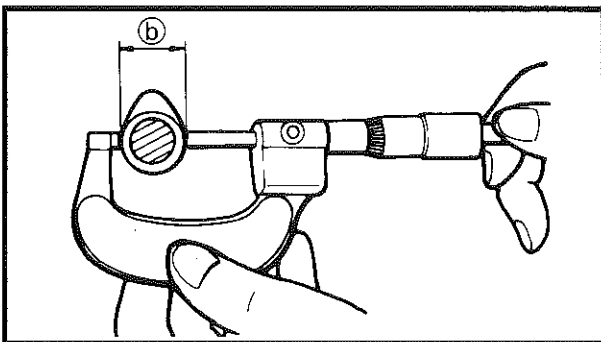
CAUTION:

Mark the intake and the exhaust valve lifters so as not to confuse them during reassembly.

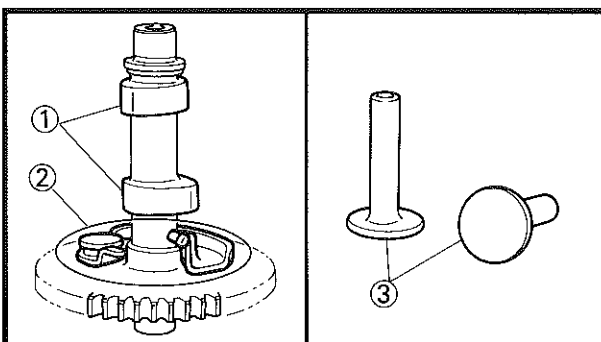


CAMSHAFT AND VALVE LIFTER INSPECTION

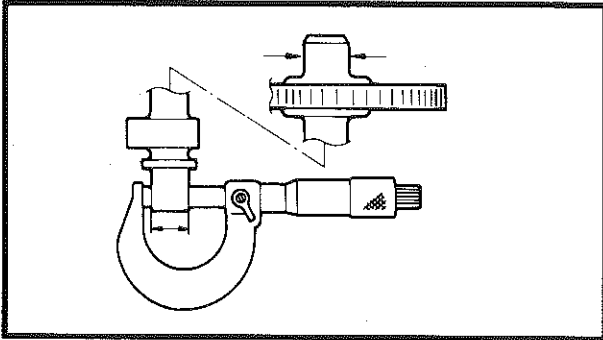
1. Measure:
- Cam lobes length ① and ②
- Use a micrometer.
Out of specification → Replace.



	Cam lobe length ①:
	Intake : 26.9 ± 0.05 mm (1.06 ± 0.002 in)
	Exhaust : 26.68 ± 0.05 mm (1.05 ± 0.002 in)
	Cam lobe length ②:
	Intake : 22.0 ± 0.05 mm (0.87 ± 0.002 in)
	Exhaust : 22.0 ± 0.05 mm (0.87 ± 0.002 in)



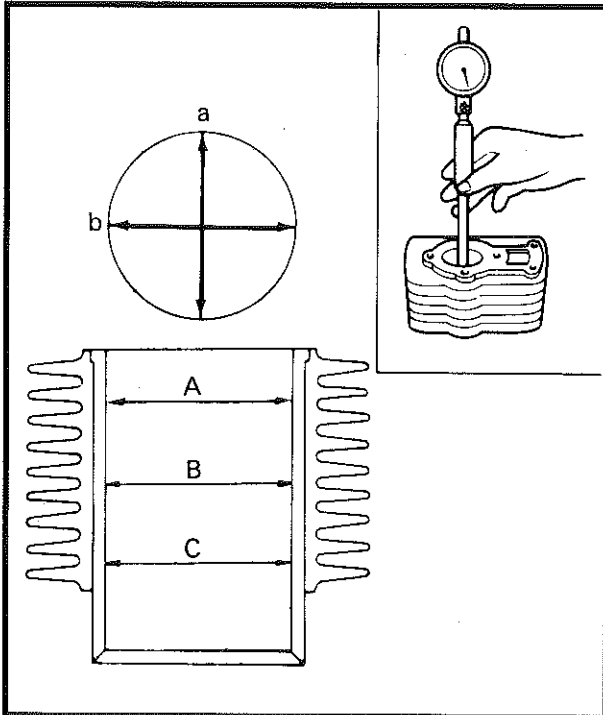
2. Inspect:
- Camshaft ①
 - Decompressor ②
 - Valve lifter ③
- Damage/Wear → Replace.



3. Measure:

- Camshaft diameter
Out of specification → Replace.

	Camshaft diameter (limit): 14.95 mm (0.589 in)
---	--




CRANKCASE INSPECTION

1. Inspect:
 - Cylinder walls
Vertical scratches → Rebore or replace cylinder.
2. Measure:
 - Cylinder inside diameter "D"

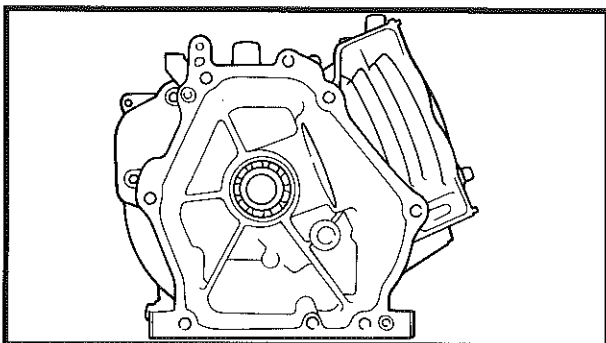
NOTE: _____
Take side to side and front to back measurements at each of the 3 locations (total of 6 measurements). Then, find the average of the measurements.

Out of specification → Rebore cylinder, and replace piston and piston rings.

		Standard	Wear limit
	Cylinder inside diameter "D"	YP20G: 56 mm (2.2 in)	56.15 mm (2.21 in)
		YP30G: 66 mm (2.6 in)	66.15 mm (2.604 in)
	Cylinder taper "T"	YP20G: 0 mm (0 in)	0.05 mm (0.002 in)
		YP30G: 0 mm (0 in)	0.05 mm (0.002 in)

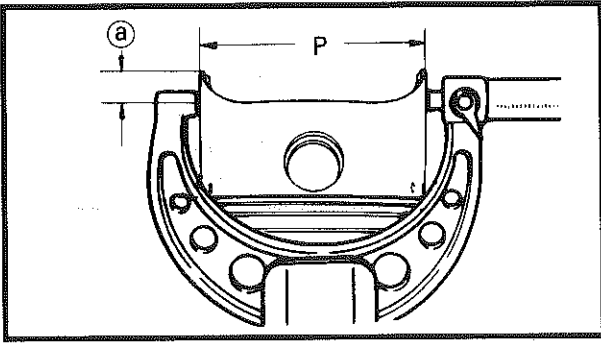
D=Maximum A, B, C

T=Maximum A-Minimum C



3. Inspect:

- Crankcase
Damage → Replace.
- Bearing
Roughness → Replace bearing.



PISTON, PISTON PIN AND PISTON RING INSPECTION

1. Measure:

- Piston skirt diameter "P"
- $a=5$ mm (0.2 in) from the piston bottom edge.



Standard piston size P:
 YP20G: 56.0 mm (2.205 in)
 YP30G: 66.0 mm (2.60 in)
Piston wear limit:
 YP20G: 55.9 mm (2.2001 in)
 YP30G: 65.9 mm (2.59 in)

2. Measure:

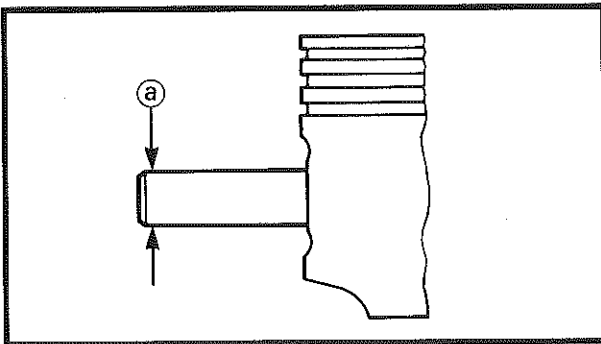
- Piston clearance

Piston clearance=
 Cylinder inside diameter "D" —
 Piston skirt diameter "P"

Out of specification → Rebore cylinder and replace piston and piston rings.



Piston clearance:
 0.015 ~ 0.040 mm
 (0.0006 ~ 0.0016 in)

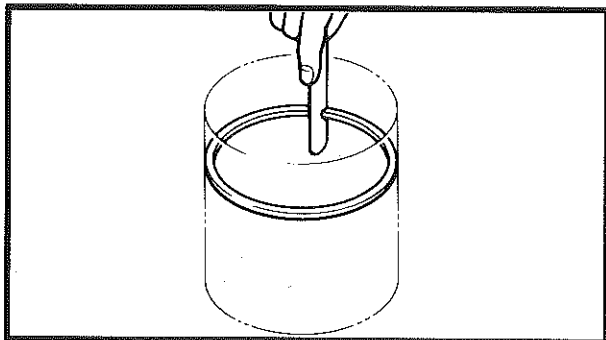


3. Measure:

- Piston pin diameter a
 Use a micrometer.
 Out of specification → Replace.



Standard piston pin diameter:
 15.995 ~ 16.00 mm
 (0.6297 ~ 0.6299 in)
Piston pin wear limit:
 15.95 mm (0.627 in)



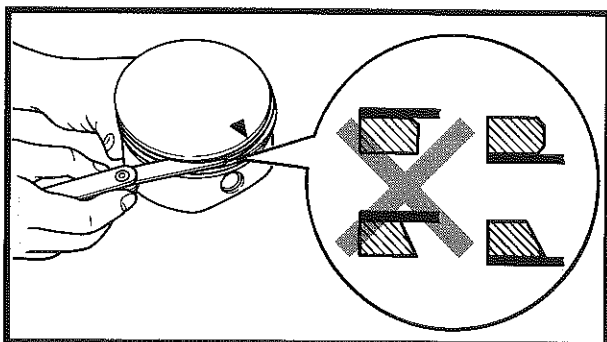
4. Measure:

- Piston ring end gap
Use a feeler gauge.
Out of specification → Replace.



Piston ring end gap:

- Top ring:**
0.2 ~ 0.4 mm (0.008 ~ 0.016 in)
- 2nd ring:**
0.2 ~ 0.4 mm (0.008 ~ 0.016 in)
- Oil ring:**
0.2 ~ 0.4 mm (0.008 ~ 0.016 in)
- Piston ring end gap limit:**
0.9 mm (0.035 in)



5. Measure:

- Piston ring side clearance
Use a feeler gauge
Out of specification → Replace.

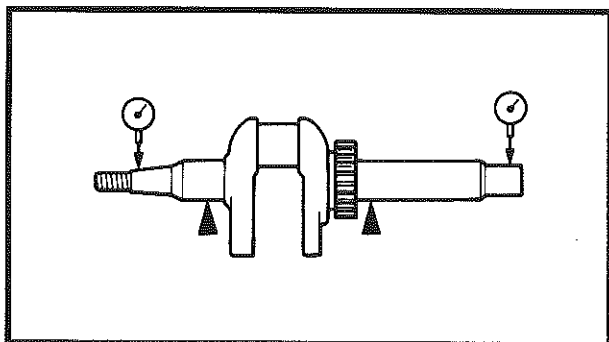
NOTE:

Clean carbon from piston ring grooves and rings before measuring the side clearance.



Piston ring side clearance:

- Top ring:**
0.04 ~ 0.08 mm
(0.0016 ~ 0.003 in)
- 2nd ring:**
0.02 ~ 0.06 mm
(0.0008 ~ 0.002 in)
- Piston ring side clearance limit:**
0.1 mm (0.004 in)



CRANKSHAFT INSPECTION

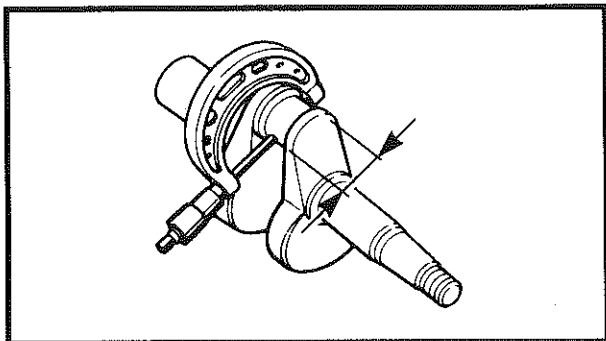
1. Measure:

- Crankshaft runout
Use a dial gauge.
Out of specification → Replace.



Crankshaft runout limit:

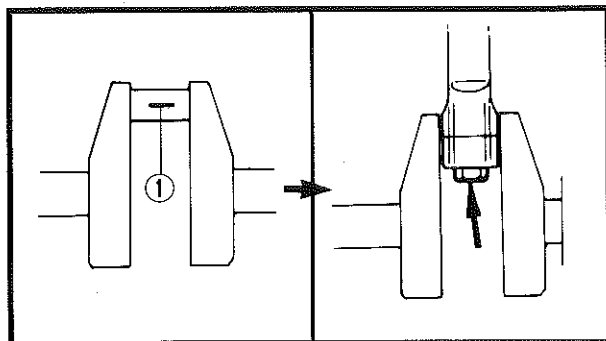
0.04 mm (0.0016 in)



2. Measure:

- Crankpin outside diameter
Use a micrometer.
Out of specification → Replace.

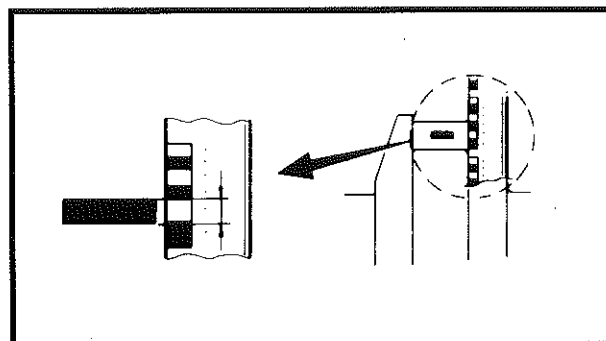
	Crankpin outside diameter: 27.969 ~ 27.984 mm (1.1011 ~ 1.1017 in)
	Crankpin outside diameter limit: 27.9 mm (1.098 in)



3. Measure:

- Oil clearance
Use plastigauge®.
Out of specification → Replace connecting rod.

	Oil clearance: 0.016 ~ 0.046 mm (0.0006 ~ 0.0018 in)
	Oil clearance limit: 0.1 mm (0.004 in)



Oil clearance measuring steps:

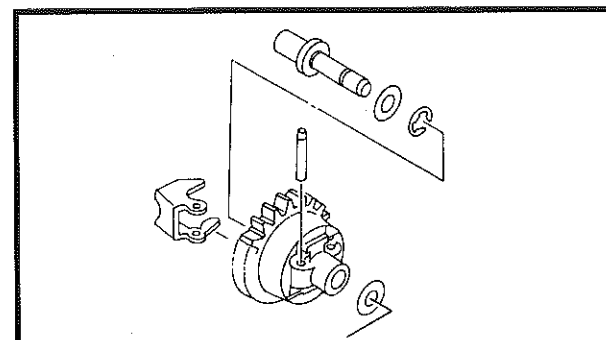
1. Clean all parts thoroughly.
2. Place plastigauge® onto crankpin.
3. Install the connecting rod and cap onto the crankcase.
4. Torque both cap bolts evenly.

	Connecting rod cap bolt: 12 Nm (1.2 m • kg. 8.7 ft • lb)
--	--

5. Remove the connecting rod and measure the plastigauge® width.

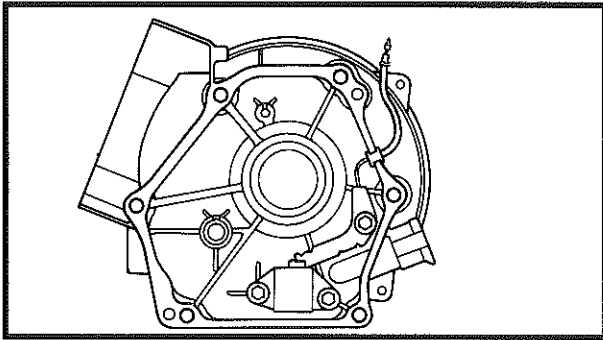
NOTE:

Do not move the crankshaft until the oil clearance measurement has been completed.



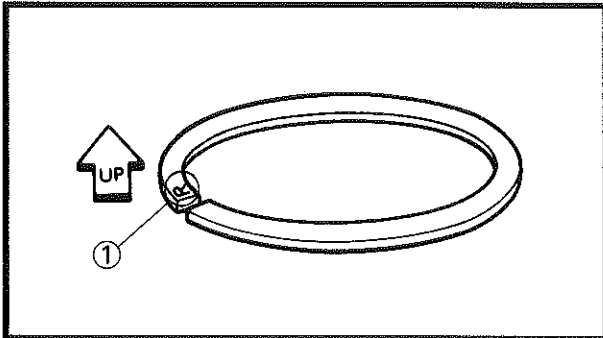
FLYWEIGHT SHAFT (GOVERNOR) GEAR INSPECTION

1. Inspect:
 - Collar
 - Washer
 - Flyweight gear
Damage/Wear → Replace.



CRANKCASE COVER INSPECTION

1. Inspect:
- Crankcase cover
 - Bearing
Damage/Roughness → Replace.

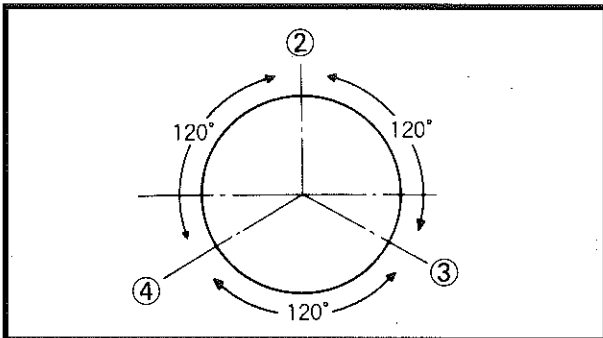


PISTON RING AND PISTON INSTALLATION

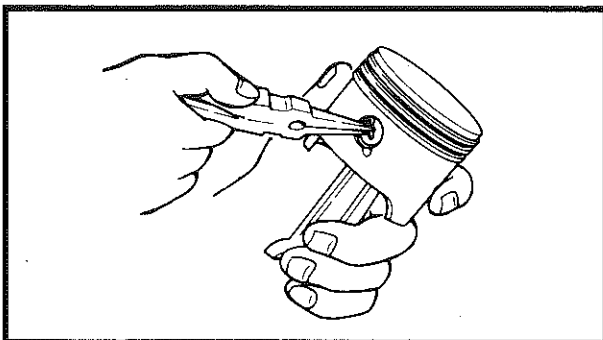
1. Install:
- Piston rings

CAUTION:

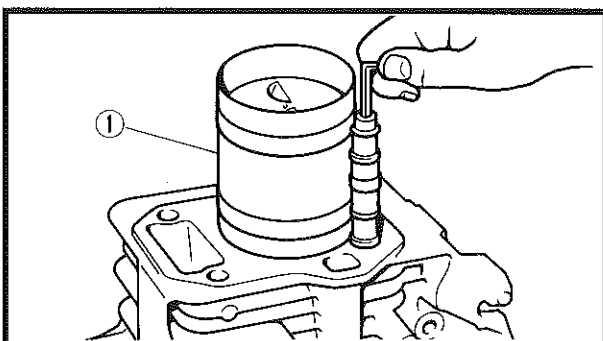
- Be sure to install the second ring so that the manufacturers mark ① faces towards the piston head.
- Be sure that each end of the piston ring is positioned, as in the illustration.



Top ring	②	
2nd ring	③	
Oil ring	④	

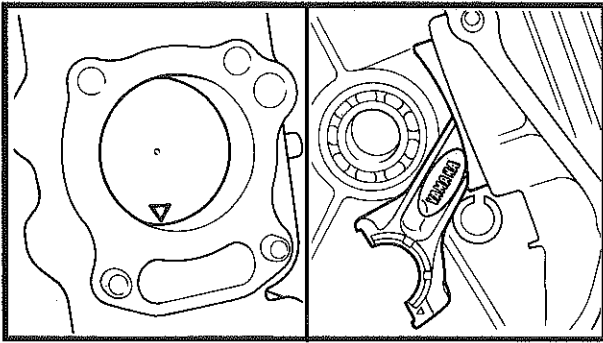


2. Install:
- Piston pin
 - Piston pin circlips **New**



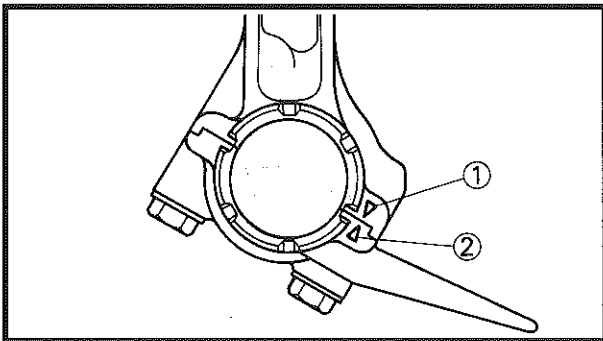
3. Install:
- Piston
Use a piston ring compressor ①.

	Piston ring compressor: YU-33294, 90890-05158
--	---



CAUTION:

- Be sure the "YAMAHA" mark on the connecting rod faces to the crankcase cover side.
- Be sure the "V" mark on the piston head faces to the push rod side.



CONNECTING ROD INSTALLATION

1. Install:

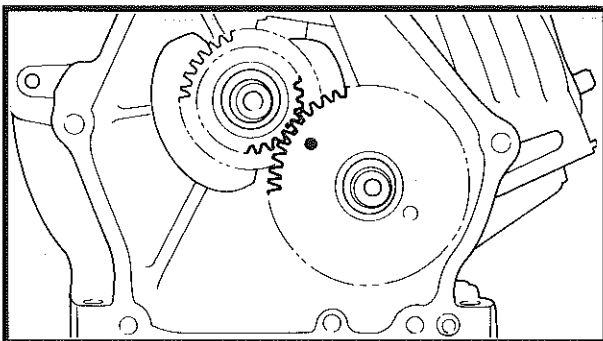
- Connecting rod cap

CAUTION:

Be sure the connecting rod mark ① is aligned with the cap mark ②.



Connecting rod cap bolt:
12 Nm (1.2 m · kg, 8.7 ft · lb)



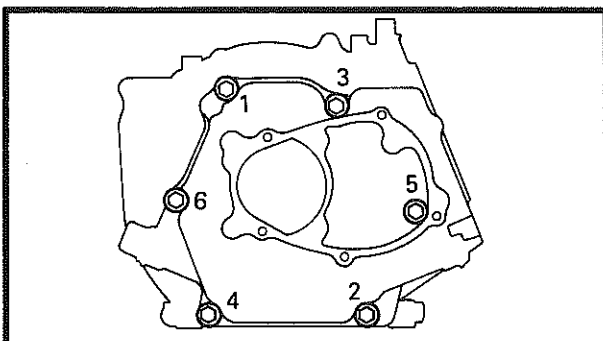
CAMSHAFT INSTALLATION

1. Install:

- Camshaft

CAUTION:

Be sure to align the camshaft gear mark with the crankshaft gear mark.



CRANKCASE COVER INSTALLATION

1. Install:

- Crankcase cover



Crankcase cover bolt:
22 Nm (2.2 m · kg, 16 ft · lb)

CAUTION:

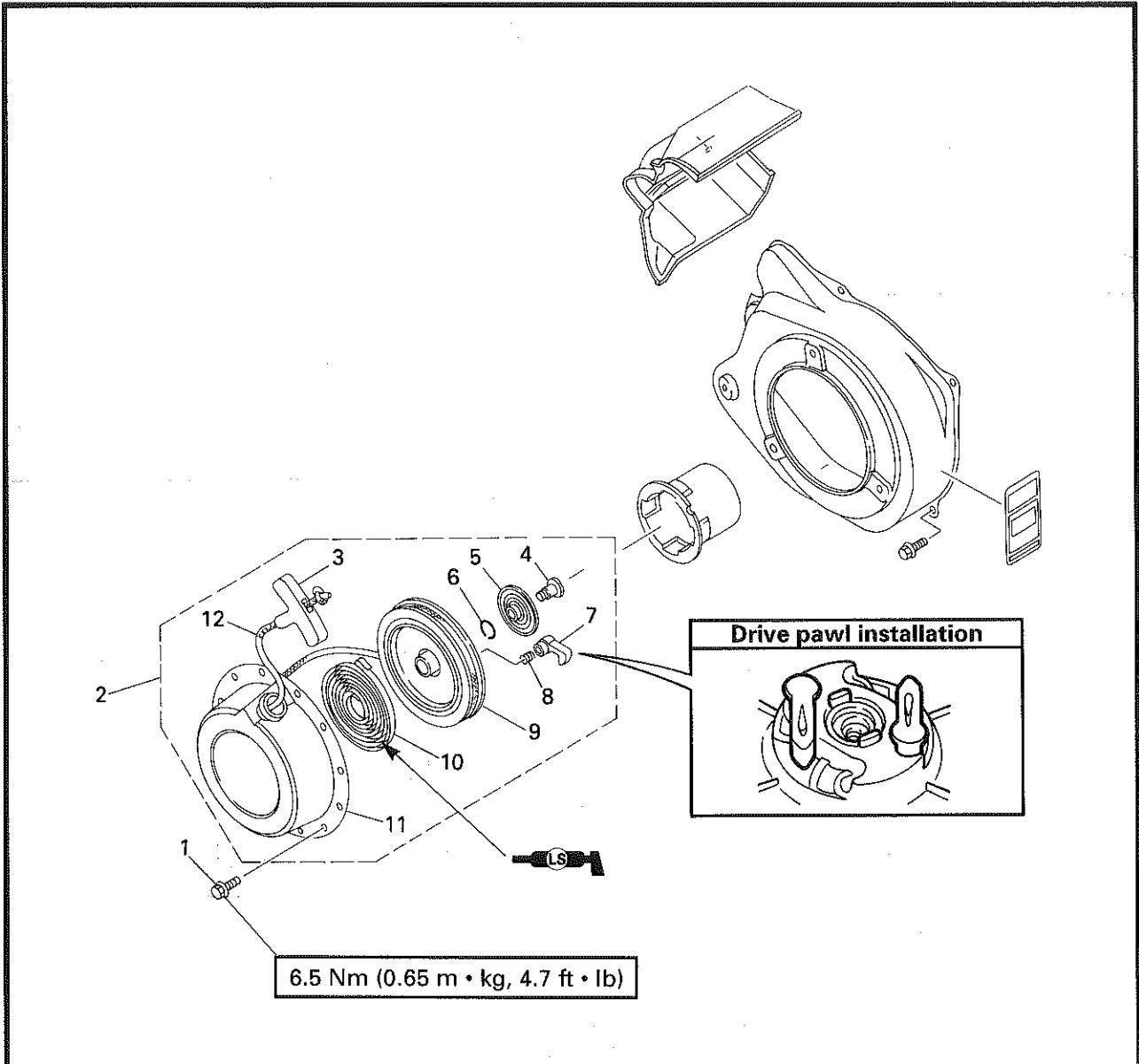
Follow proper tightening sequence.

2. Adjust:

- Crankshaft side clearance
Refer to the "CRANKSHAFT SIDE CLEARANCE" section in CHAPTER 2.

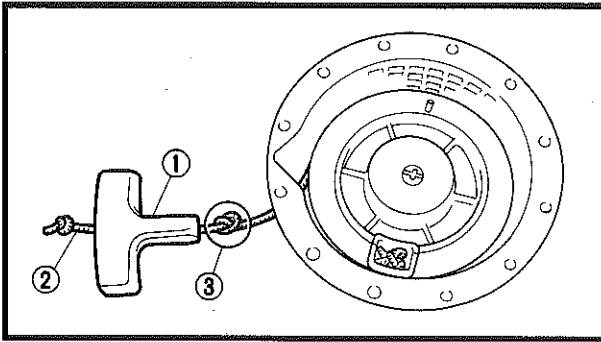


RECOIL STARTER



JOB INSTRUCTION CHART

Order	Job name/Parts name	Q'ty	Remarks
	Removal of recoil starter		Remove the parts in the order below.
1	Bolt	3	
2	Recoil starter	1	
3	Starter handle	1	
4	Bolt	1	
5	Drive plate	1	
6	Clip	1	
7	Drive pawl	2	
8	Spring	2	
9	Drum sheave	1	
10	Starter spring	1	
11	Starter case	1	
12	Starter rope	1	
			Reverse the removal procedure for installation.



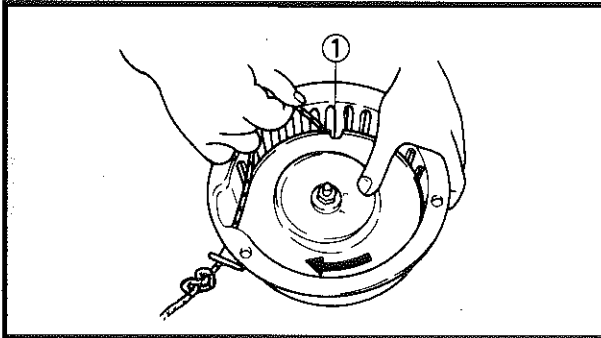
RECOIL STARTER REMOVAL

1. Remove:

- Starter handle ①

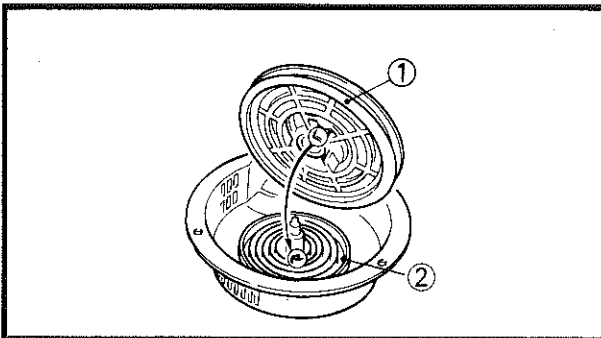
NOTE:

Before untying the knot ② above the starter handle, make a knot ③ on the rope so that the rope is not pulled into the case.



CAUTION:

Release the spring pre-load before removing the sheave drum bolt. Hook the rope into the sheave drum slot ① and turn the sheave drum assembly clockwise.

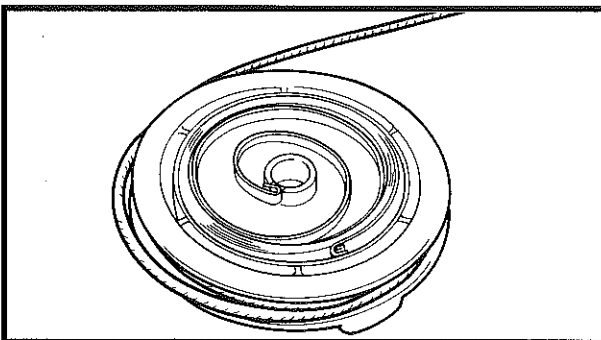


2. Remove:

- Drum sheave ①
- Starter spring ②

CAUTION:

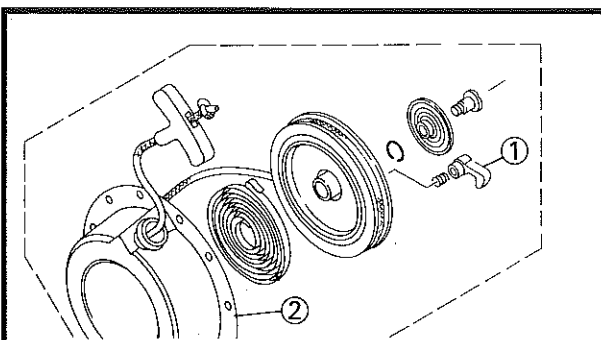
Be sure to press down on the drum sheave, because the spring will spread out suddenly when it is removed from the sheave drum.



RECOIL STARTER INSPECTION

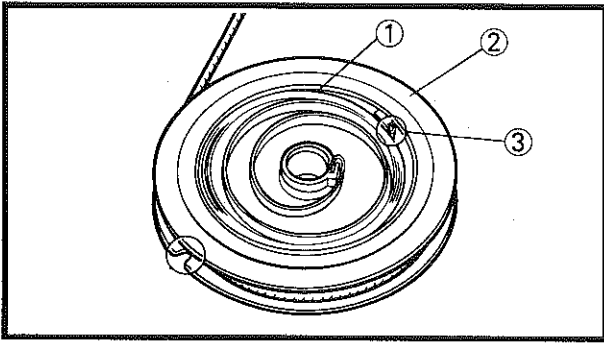
1. Inspect:

- Starter rope
Damage/Wear → Replace.
- Starter spring
Contamination → Clean and apply grease.
Damage/Wear → Replace.



2. Inspect:

- Drive pawl ①
Damage/Wear → Replace.
- Starter case ②
Cracks/Damage → Replace.



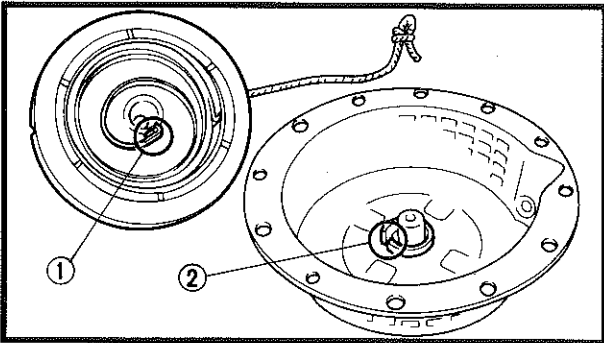
RECOIL STARTER INSTALLATION

1. Install:

- Starter spring ①
- Sheave drum ②

CAUTION:

Engage the spring hook ③ with the drum slit, then wind the spring counterclockwise into the drum from larger to smaller diameter.

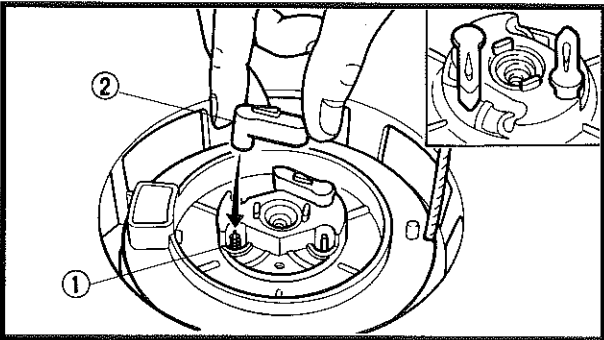


2. Install:

- Starter rope

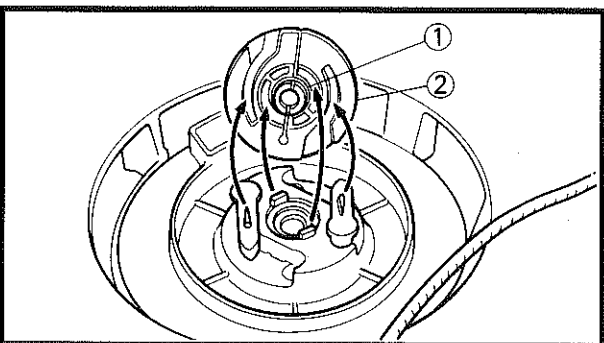
CAUTION:

Engage the spring hook ① with the starter case hook ②.



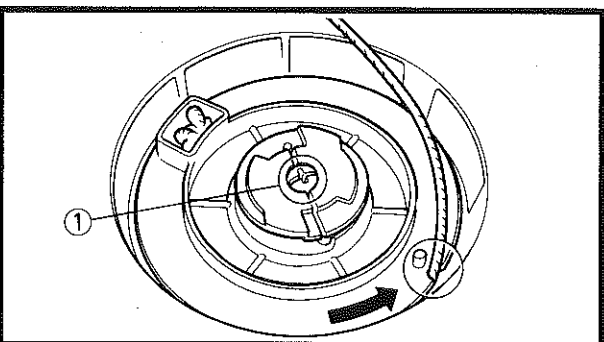
3. Install:

- Springs ①
- Drive pawls ②



4. Install:

- Clip ①
- Drive plate ②



5. Install:

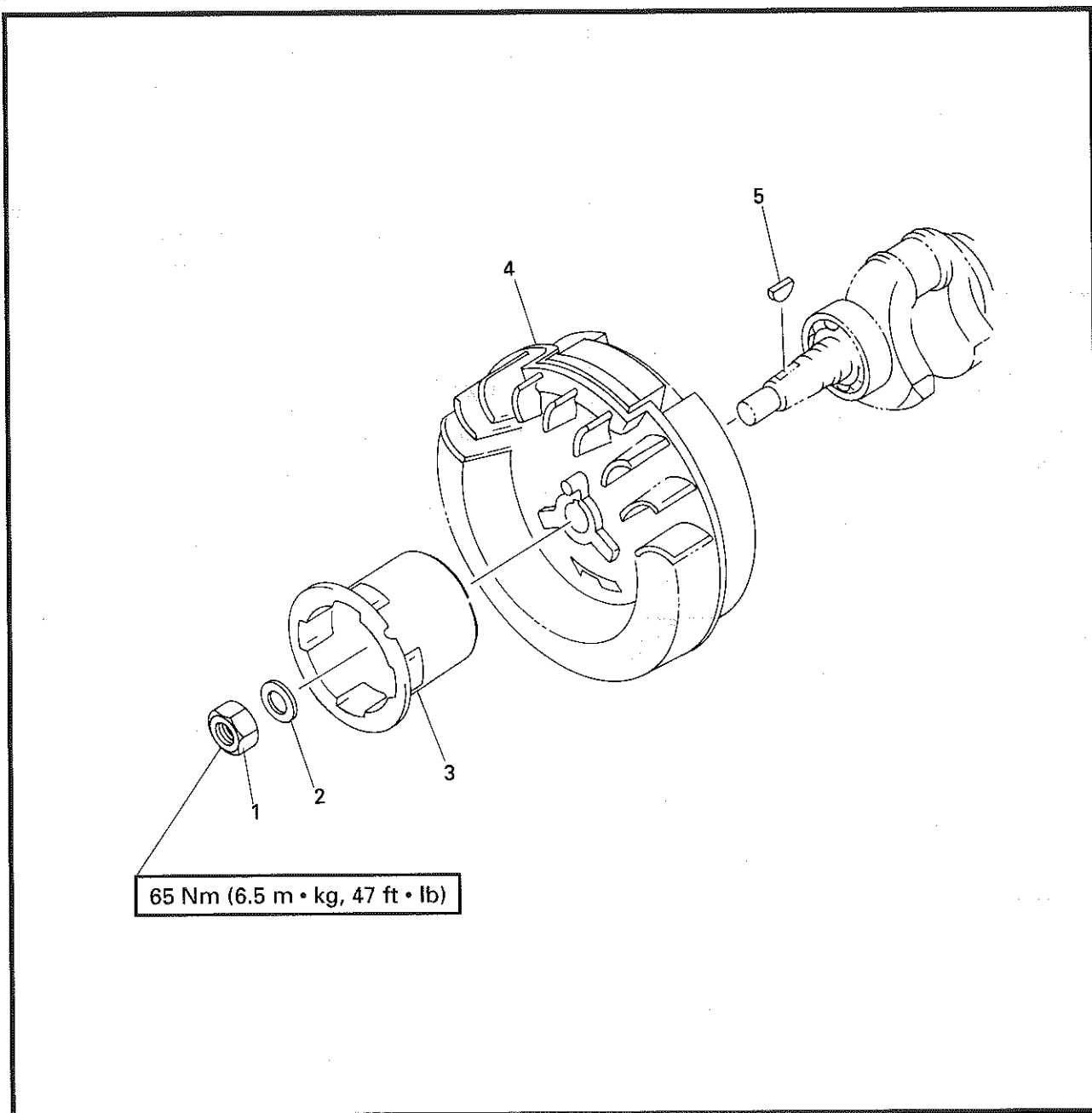
- Bolt ①

CAUTION:

Turn the drum sheave counterclockwise 4 turns to give spring preload.



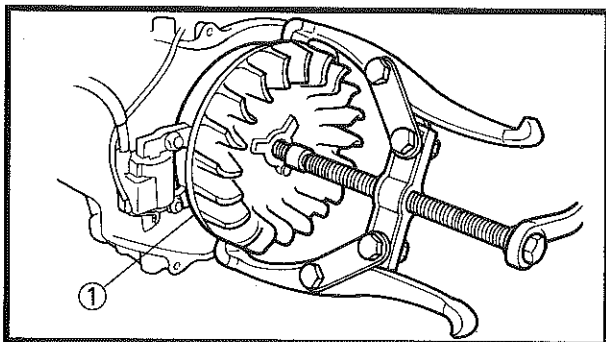
FLYWHEEL



65 Nm (6.5 m • kg, 47 ft • lb)

JOB INSTRUCTION CHART

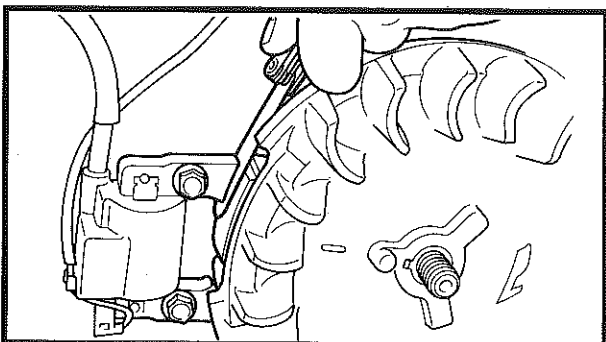
Order	Job name/Parts name	Q'ty	Remarks
	Removal of flywheel		Remove the parts in the order below. Refer to the "AIR FILTER" section in the CHAPTER 2. Refer to the "CARBURETOR" section. Refer to the "RECOIL STARTER" section.
	Air filter		
	Carburetor		
	Recoil starter		
	1 Nut	1	
2	Washer	1	
3	Starter pulley	1	
4	Flywheel	1	
5	Key	1	
			Reverse the removal procedure for installation.



FLYWHEEL REMOVAL

1. Remove:

- Flywheel ①
Use a bearing puller (General tool)



FLYWHEEL INSTALLATION

1. Install:

- Flywheel

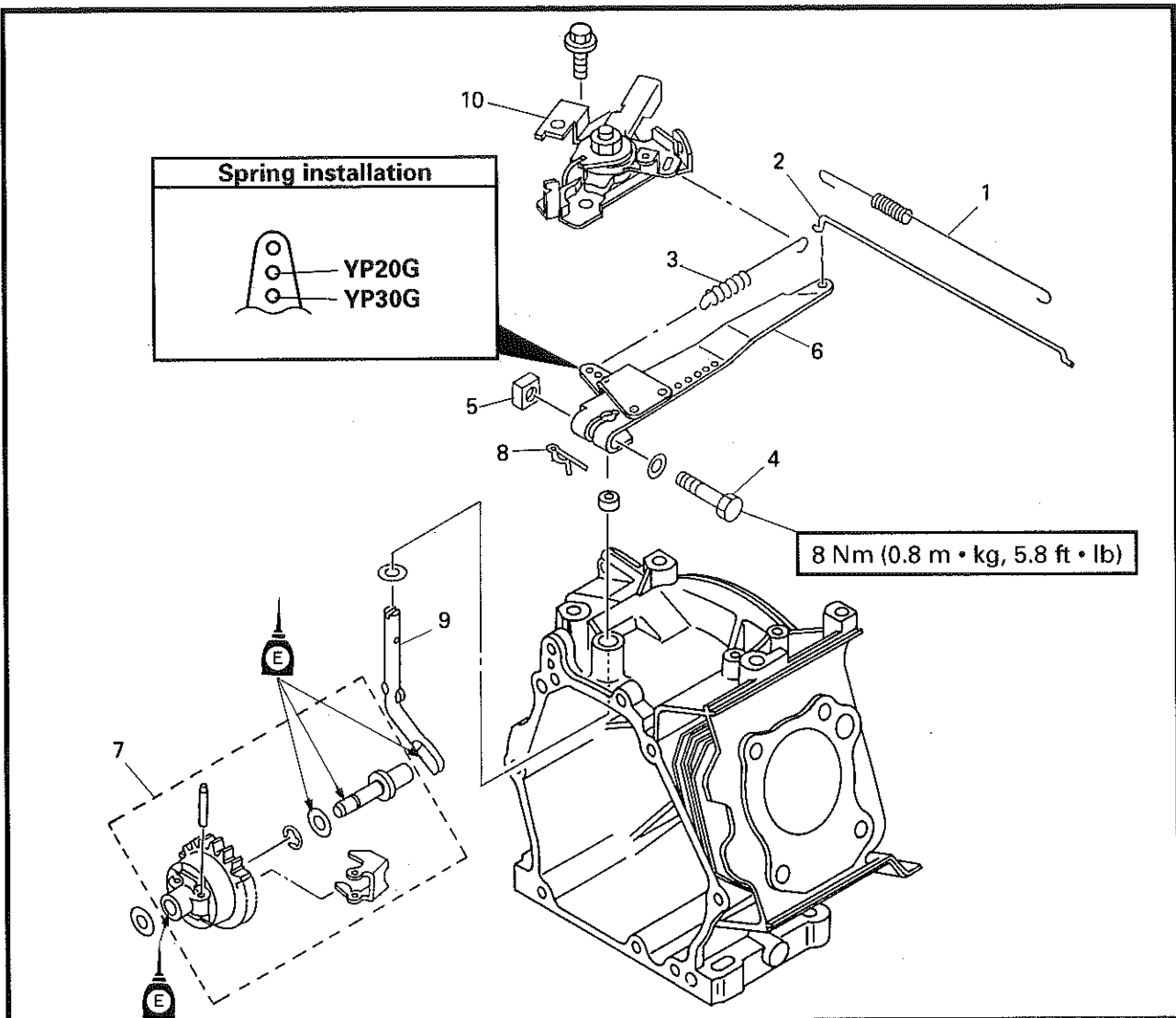
	<p>Flywheel nut: 65 Nm (6.5 m • kg, 47 ft • lb)</p>
--	--

	<p>T.C.I. air gap: 0.5 mm (0.0197 in)</p>
--	--

Refer to the "T.C.I. AIR GAP" section in the CHAPTER 2.

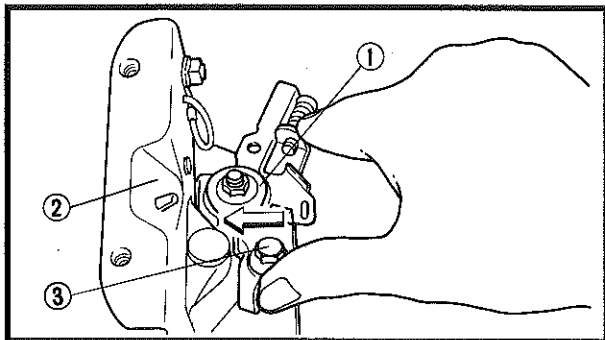


GOVERNOR



JOB INSTRUCTION CHART

Order	Job name/Parts name	Q'ty	Remarks
	Removal of governor		Remove the parts in the order below. Refer to "FUEL TANK" section. Refer to "PUMP" section in CHAPTER 3. Refer to "CRANKCASE" section.
	Fuel tank		
	Water pump assembly		
	Crankcase cover		
1	Spring	1	
2	Link rod	1	
3	Spring	1	
4	Bolt	1	NOTE: Lightly tap the shaft from the outside of the crankcase cover.
5	Nut	1	
6	Governor arm	1	
7	Flyweight shaft assembly	1	
8	Clip	1	Reverse the removal procedure for installation.
9	Governor shaft	1	
10	Throttle lever assembly	1	



Throttle lever assembly Installation

1. Install:

- Throttle lever assembly ①

NOTE:

Push the throttle lever assembly ① towards the fuel tank stay ② until the side of the throttle lever assembly is against the fuel tank stay ②. Then tighten the bolt ③.

2. Adjust:

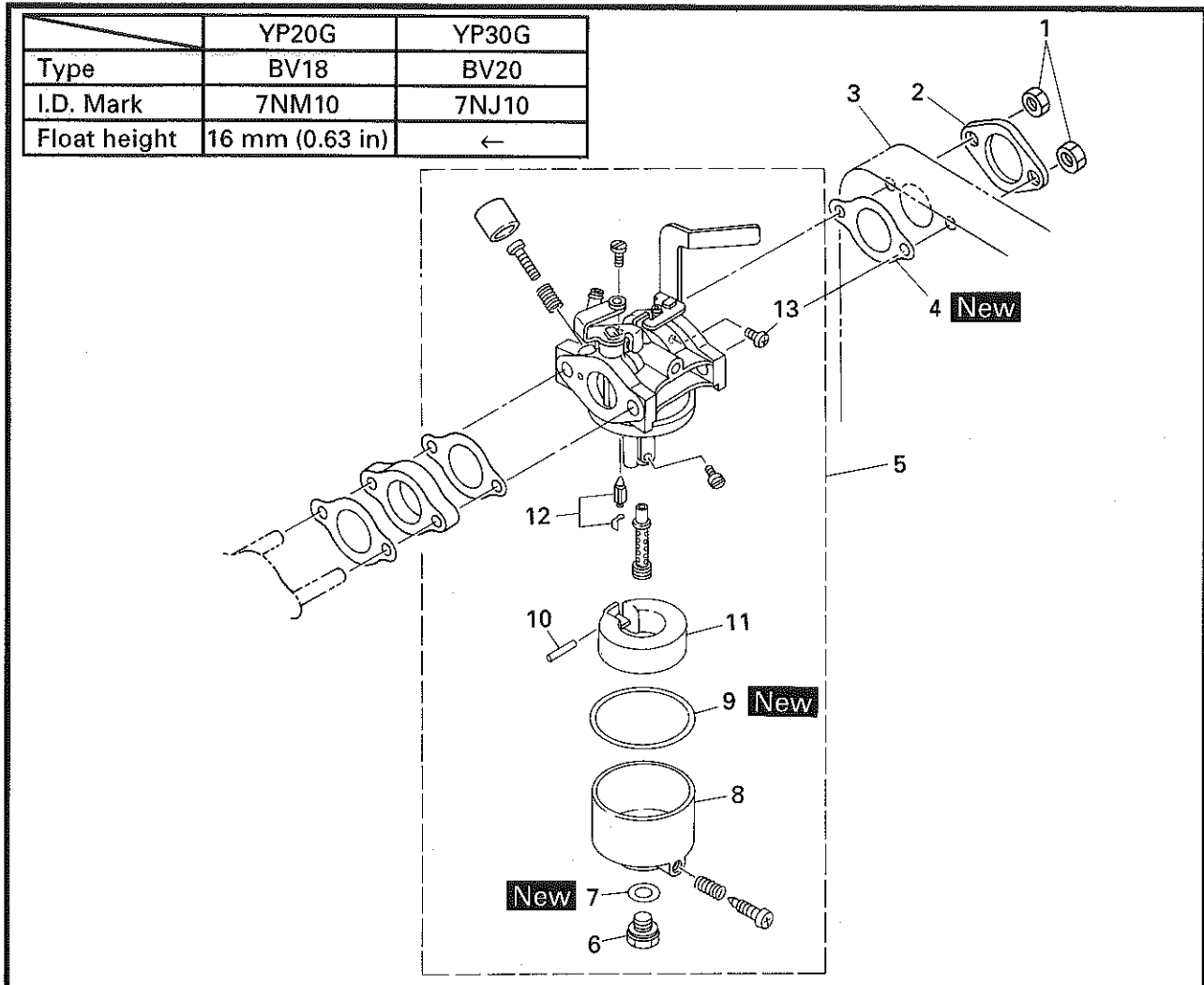
- Governor
- Engine speed

Refer to the "GOVERNOR ADJUSTMENT" and "ENGINE SPEED ADJUSTMENT" section in CHAPTER 2.



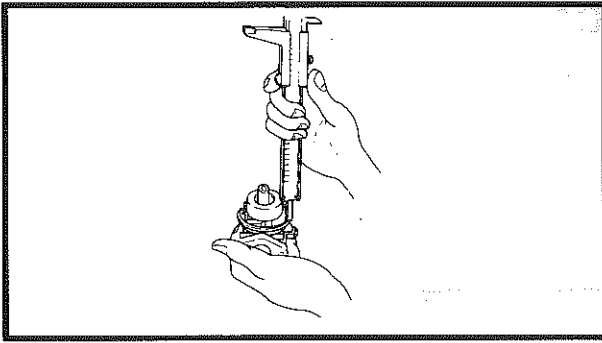
CARBURETION

CARBURETOR



JOB INSTRUCTION CHART

Order	Job name/Parts name	Q'ty	Remarks
	Removal of carburetor		
	Air filter		Remove the parts in the order below. Refer to the "AIR FILTER" section in the CHAPTER 2.
1	Nut	2	
2	Plate	1	
3	Air filter case	1	
4	Gasket	1	
5	Carburetor assembly	1	
6	Bolt	1	
7	Gasket	1	
8	Float chamber body	1	
9	Gasket	1	
10	Float pin	1	
11	Float	1	
12	Needle assembly	1	
13	Screw	1	
			Reverse the removal procedure for installation.



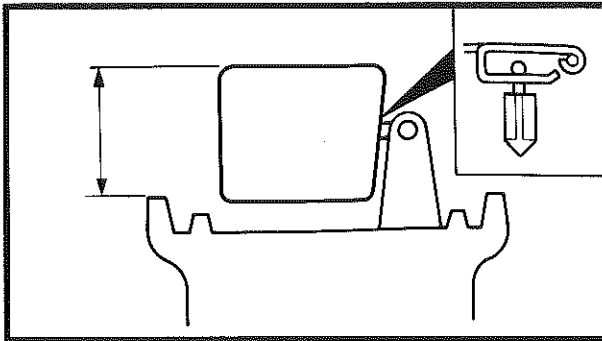
FLOAT HEIGHT INSPECTION

1. Measure:
- Float height

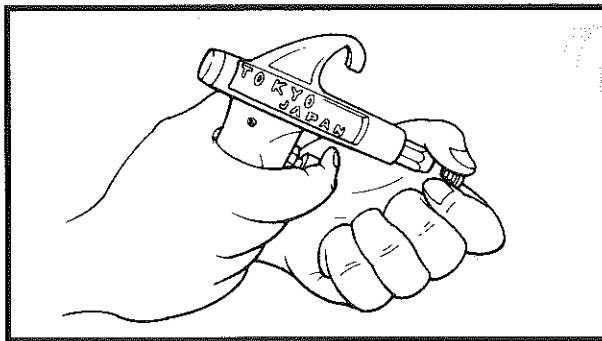
NOTE:

Place the carburetor in an inverted position for measurement.

Lift up the float so that the tip of the float valve lightly contacts the float arm, and measure the float height. (This measurement should be made with the gasket removed.)



Float height:
16 mm (0.63 in)



FUEL PASSAGE INSPECTION

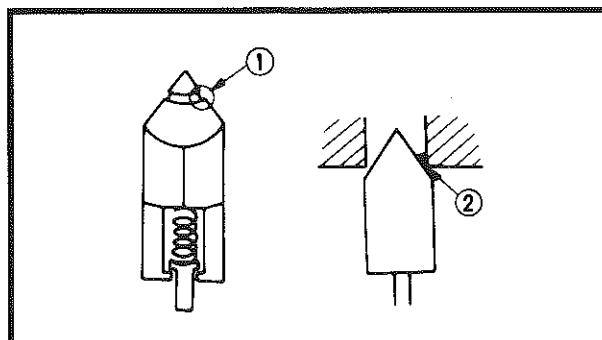
1. Inspect:
- Carburetor body
 - Fuel passage
Contamination → Clean as indicated.

Carburetor cleaning steps:

- Wash the carburetor in petroleum based solvent. (Do not use any caustic carburetor cleaning solution.)
- Blow out all passages and jets with compressed air.

CAUTION:

Never use a wire.



VALVE SEAT INSPECTION

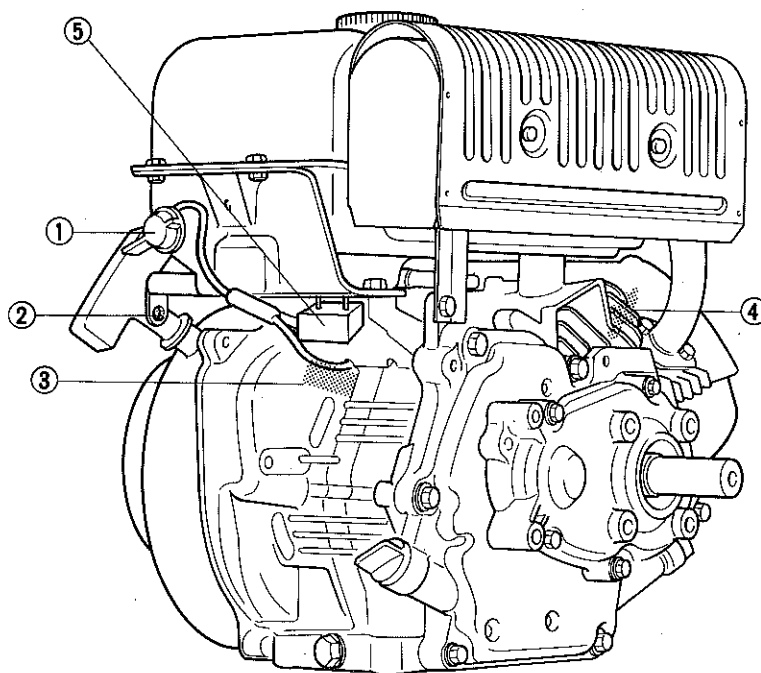
1. Inspect:
- Valve seat
Damage/Wear → Replace.
Contamination → Clean.
- ① Grooved wear
② Dust



ELECTRICAL

ELECTRICAL COMPONENTS

- ① Engine stop switch
- ② Oil level warning light
- ③ T.C.I. unit
- ④ Spark plug
- ⑤ Oil warning unit



*: This illustration may differ from the actual engine.

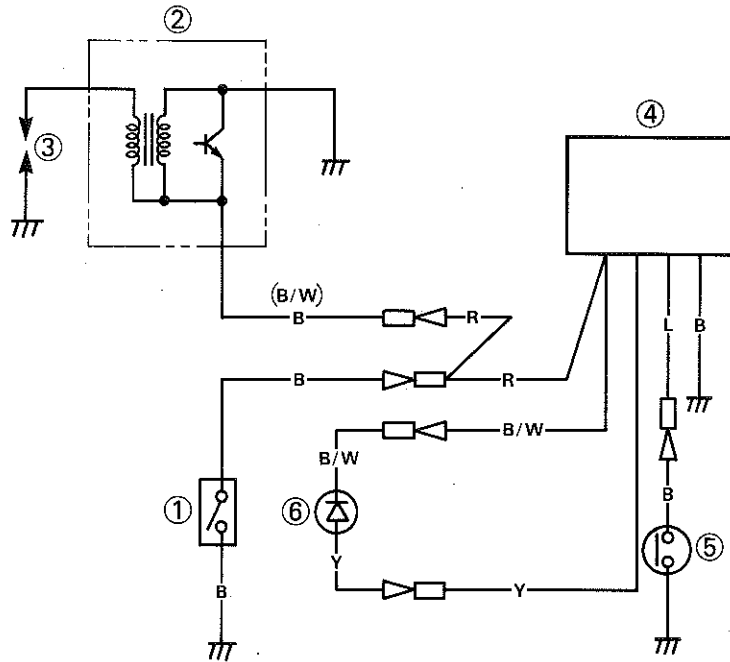


CIRCUIT DIAGRAM

- ① Engine stop switch
- ② T.C.I. unit
- ③ Spark plug
- ④ Oil warning unit
- ⑤ Oil level switch
- ⑥ Oil level warning light

COLOR CODE

- B Black
- L Blue
- R Red
- Y Yellow
- B/W Black/White



6




TROUBLESHOOTING CHART

NO SPARK OR WEAK SPARK

NOTE:

- Remove the following parts before troubleshooting.
 - 1) Spark plug
- Use the following special tool(s) in this troubleshooting.

 **Pocket tester:**
YU-03112, 90890-03112

 **Dynamic spark tester
(Ignition checker):**
YM-34487, 90890-06754

1. Spark plug

- Check the spark plug condition. Refer to the "SPARK PLUG" section in the CHAPTER 2.

↓ CORRECT

INCORRECT

Repair or replace the spark plug.

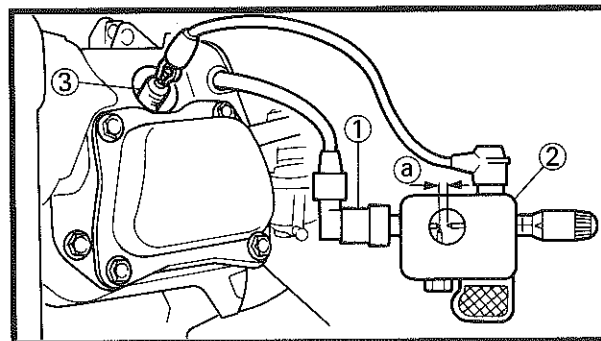
2. Ignition spark gap

- Disconnect the spark plug cap ① from the spark plug.
- Connect the ignition checker ② as shown.

Spark plug cap ① → Ignition checker
Ignition checker lead → Spark plug ③

- Turn the crank and measure the ignition spark gap ④.

Minimum spark gap:
6 mm (0.24 in)



MEETS SPECIFICATION

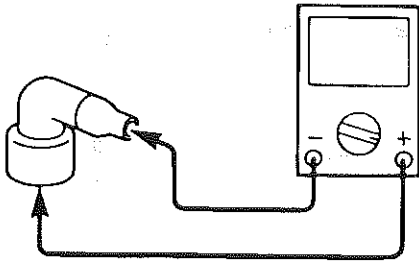
↓ OUT OF SPECIFICATION OR NO SPARK
*

Ignition system is good.



3. Spark plug cap resistance

- Remove the spark plug cap.
- Connect the pocket tester ($\Omega \times 1k$) to the spark plug cap.
- Check the spark plug cap for resistance.



Spark plug cap resistance:
5 k Ω \pm 20% at 20°C (68°F)

MEETS SPECIFICATION

4. T.C.I. unit coil resistance

- Remove the T.C.I. unit
- Connect the pocket tester ($\Omega \times 1k$) to the T.C.I. unit.

Tester (+) lead \rightarrow Orange terminal ①



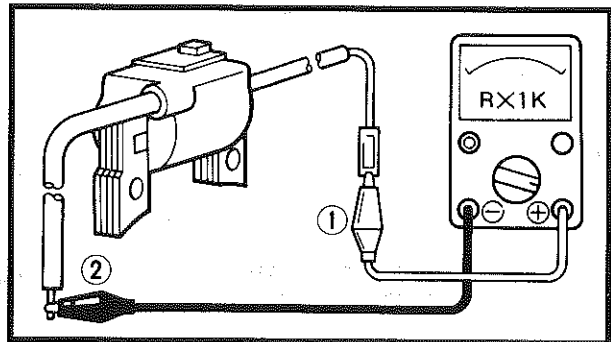
T.C.I. unit coil resistance:
11.7 k Ω \pm 10%

MEETS SPECIFICATION

*

OUT OF SPECIFICATION

Replace the spark plug cap.



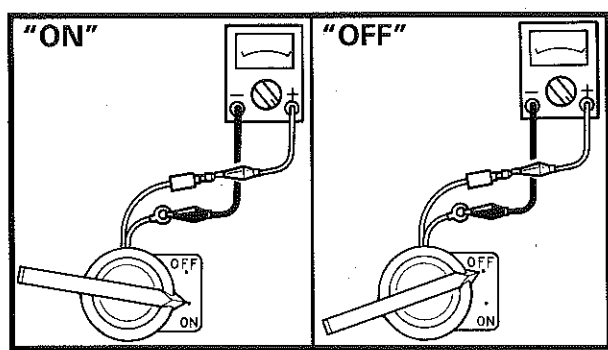
OUT OF SPECIFICATION

Replace T.C.I. unit.



5. Engine stop switch

- Disconnect the engine stop switch leads.
- Connect the pocket tester ($\Omega \times 1$) to the engine stop switch.
- Turn the engine stop switch to "ON" and check the engine stop switch for continuity.



CONTINUITY



NO CONTINUITY

- Turn the engine stop switch to "OFF" and check the engine stop switch for continuity.

NO CONTINUITY

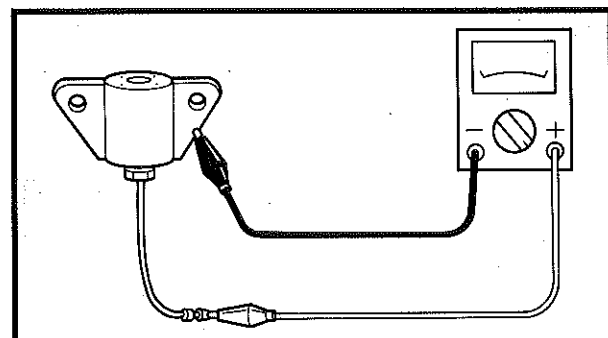
Replace the engine stop switch.



CONTINUITY

6. Oil level switch

- Drain the engine oil. Refer to the "ENGINE OIL" section in CHAPTER 2.
- Remove the oil level switch. Refer to the "CRANKCASE" section in CHAPTER 4.
- Connect the pocket tester as shown.

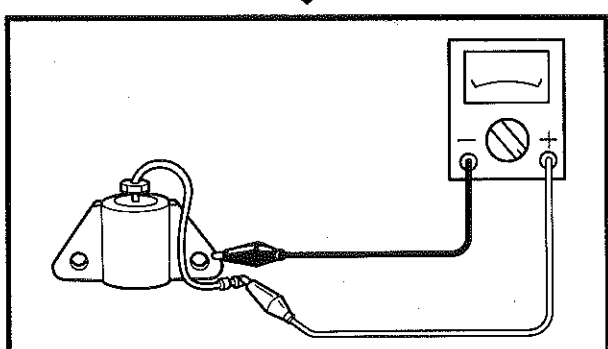


CONTINUITY



NO CONTINUITY

Replace the oil level switch.



- Turn over the oil lever switch as shown.

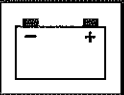
NO CONTINUITY


Replace the oil level switch.



CONTINUITY

*



• Tighten the oil level switch bolts.	
	10 Nm (1.0 m · kg, 7.2 ft · lb)



7. Wiring connections
• Check the connections on the entire ignition system.

POOR CONNECTION



Properly connect the ignition system.



CORRECT

Replace flywheel.



SPECIFICATIONS


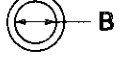
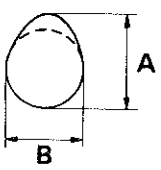
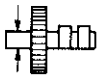
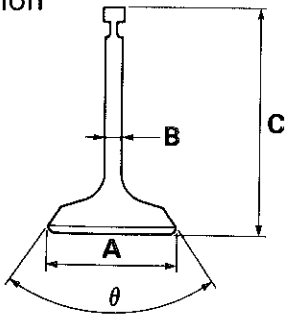
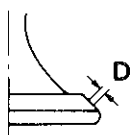
GENERAL SPECIFICATIONS

	Unit	YP20G	YP30G
MODEL CODE NUMBER		7RN	7RP
DIMENSIONS			
Overall length	mm (in)	391 (15.4)	397 (15.6)
Overall width	mm (in)	502 (19.8)	518 (20.4)
Overall height	mm (in)	454 (17.9)	466 (18.3)
Dry weight	kg (lb)	27 (59.5)	30 (66.1)
ENGINE			
Engine type		4-stroke OHV forced air cooled	←
Cylinder arrangement		1	←
Displacement	L	0.123	0.171
Bore × Stroke	mm (in)	56 × 50 (2.20 × 1.97)	66 × 50 (2.60 × 1.97)
Compression ratio		8.3 : 1	8.5 : 1
Rated output	kw (PS)/3,600 r/min	2.0 (2.8)	3.3 (4.5)
Fuel		Unleaded regular gasoline	←
Fuel tank capacity	L (Imp gal, US gal)	4.5 (2.64, 3.17)	←
Engine oil capacity	L (Imp qt, US qt)	0.6 (0.53, 0.63)	←
Engine oil grade		4-stroke engine oil API service classification SE or SF if not available, SD 	
IGNITION SYSTEM			
Ignition timing		T.C.I. BTDC 23°	←
Spark plug type		BPR4ES (NGK)	←
Gap	mm (in)	0.7~0.8 (0.028~0.031)	←

MAINTENANCE SPECIFICATIONS

SPEC

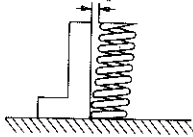
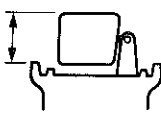


	Unit	YP20G		YP30G		
CONNECTING ROD	mm (in)					
Small end dia "A"		16.006~16.020 (0.6301~0.6307)		←		
Oil clearance		0.006~0.025 (0.0002~0.001)		←		
Big end dia "B"		28.00~28.015 (1.1023~1.1029)		←		
Oil clearance		0.016~0.046 (0.0006~0.0018)		←		
<Limit>		0.1 (0.004)		←		
CAMSHAFT	mm (in)					
Camshaft outside dia.						
Cam dimension		IN	EX	IN	EX	
"A"		26.9 (1.06)	26.68 (1.05)	←	←	
"B"		22.0 (0.87)	22.0 (0.87)	←	←	
Camshaft journal		14.973~14.989 (0.5895~0.5901)		←		
<Limit>		14.95 (0.589)		←		
VALVE	mm (in)					
Valve dimension						
Head dia "A"	IN	21.0 (0.83)		24.0 (0.94)		
	EX	19.0 (0.75)		22.0 (0.87)		
Stem dia "B"	IN	5.5 (0.22)		←		
	EX	5.5 (0.22)		←		
Length "C"	IN	64.5 (2.54)		65.9 (2.59)		
	EX	64.5 (2.54)		66.2 (2.61)		
Seat width "D"	IN	0.7 (0.03)		←		
	EX	0.7 (0.03)		←		
<Limit>		1.7 (0.067)		←		
"θ"		90°		←		
Valve guide						
Guide inside dia	IN	5.5 (0.22)		←		
	EX	5.5 (0.22)		←		
Stem to guide clearance	IN	0.04~0.06 (0.0016~0.002)		←		
	EX	0.06~0.08 (0.002~0.003)		←		
Valve clearance	IN	0.1 (0.004)		←		
	EX	0.1 (0.004)		←		
PUSH ROD	mm (in)					
Runout limit		0.5 (0.02)		←		

MAINTENANCE SPECIFICATIONS

SPEC



	Unit	YP20G	YP30G
VALVE SPRING			
Free length	mm (in) IN	26.5 (1.04)	←
	EX	26.5 (1.04)	←
Set length	IN	21.6 (0.85)	←
	EX	18.9 (0.74)	←
Set force	IN	4.5 kg (9.9 lb)	←
	EX	7.0 kg (15.4 lb)	←
Tilt limit		1.0 (0.04)	←
			
CARBURETOR			
Type/Manufacturer	mm (in)	BV18-11/MIKUNI	BV20-15/MIKUNI
Bore size		ø18/11	ø20/15
Main jet		#75.0	#91.3
Pilot jet		#38.8	#42.5
Pilot screw		2-1/4	1-3/4
Valve seat size		ø1.5 (0.06)	ø1.8 (0.07)
Float height		16 (0.63)	←
			

ELECTRICAL

	Unit	YP20G	YP30G
ELECTRICAL			
Ignition system		T.C.I.	←
Coil resistance		11.7KΩ±10%	←



TIGHTENING TORQUE

Item	Model	YP20G		YP30G	
		Thread size	Torque Nm (m • kg, ft • lb)	Thread size	Torque Nm (m • kg, ft • lb)
Cylinder head		M 8 × 1.25	20 (2.0, 14.5)	M 8 × 1.25	20 (2.0, 14.5)
Cylinder head cover		M 6 × 1.0	10 (1.0, 7.2)	M 6 × 1.0	10 (1.0, 7.2)
Crankcase cover		M 8 × 1.25	22 (2.2, 15.9)	M 8 × 1.25	22 (2.2, 15.9)
Spark plug		M 14 × 1.25	18 (1.8, 13)	M 14 × 1.25	18 (1.8, 13)
Fan case		M 6 × 1.0	7 (0.7, 5.0)	M 6 × 1.0	7 (0.7, 5.0)
Connecting rod		M 7 × 1.0	12 (1.2, 8.7)	M 7 × 1.0	12 (1.2, 8.7)
Flywheel magneto		M 14 × 1.5	65 (6.5, 47.0)	M 14 × 1.5	65 (6.5, 47.0)
Governor arm		M 6 × 1.0	8 (0.8, 5.8)	M 6 × 1.0	8 (0.8, 5.8)
Oil level switch		M 6 × 1.0	10 (1.0, 7.2)	M 6 × 1.0	10 (1.0, 7.2)
T.C.I. unit		M 6 × 1.0	10 (1.0, 7.2)	M 6 × 1.0	10 (1.0, 7.2)
Oil drain plug		M 10 × 1.25	17 (1.7, 12.3)	M 10 × 1.25	17 (1.7, 12.3)
Rocker arm lock nut		M 6 × 0.5	10 (1.0, 7.2)	M 6 × 0.5	10 (1.0, 7.2)
Push rod guide		M 6 × 1.0	10 (1.0, 7.2)	M 6 × 1.0	10 (1.0, 7.2)

GENERAL TORQUE SPECIFICATIONS/ DEFINITION OF UNITS

SPEC



GENERAL TORQUE SPECIFICATIONS

This chart specifies torque for standard fasteners with standard I.S.O. pitch threads. Torque specifications for special components or assemblies are included in the applicable sections of this book. To avoid warpage, tighten multifastener assemblies in a criss-cross fashion, in progressive stages, until full torque is reached. Unless otherwise specified, torque specifications call for clean, dry threads. Components should be at room temperature.

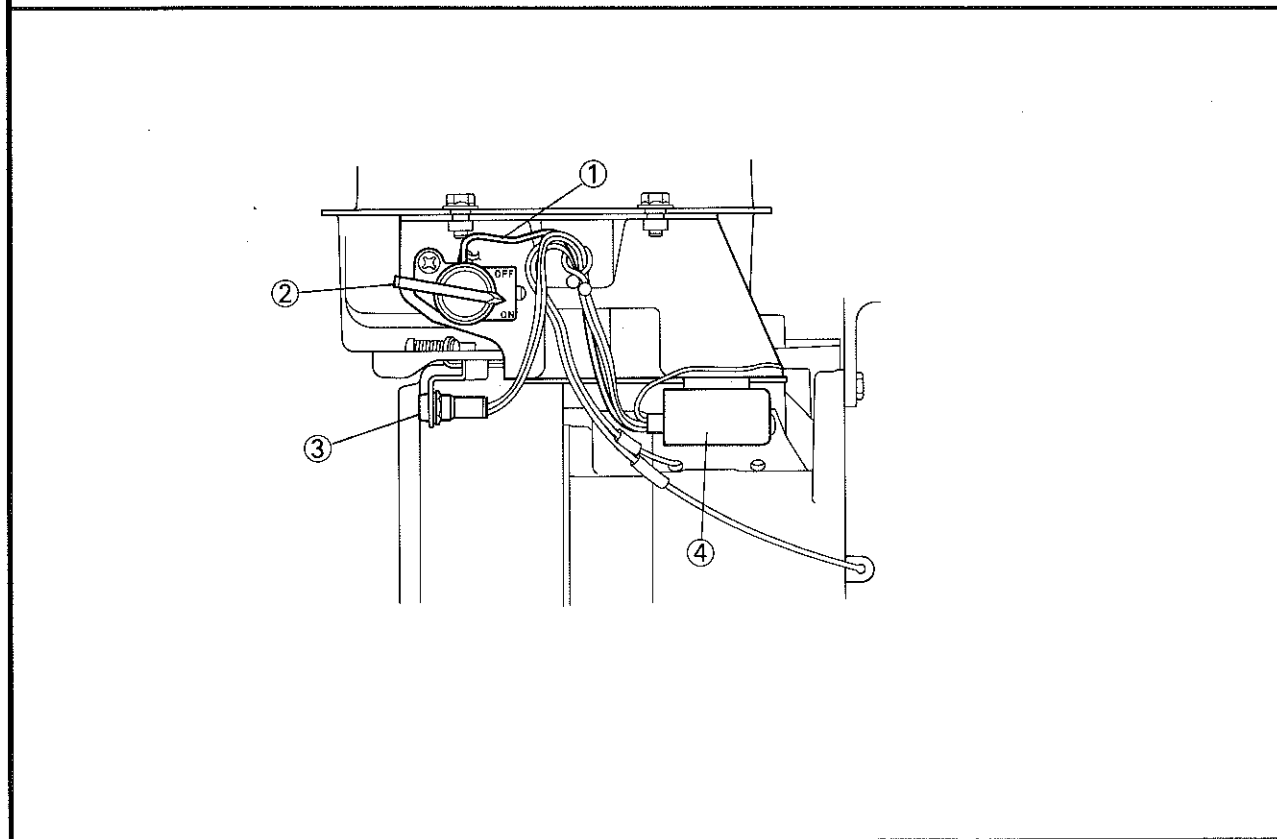
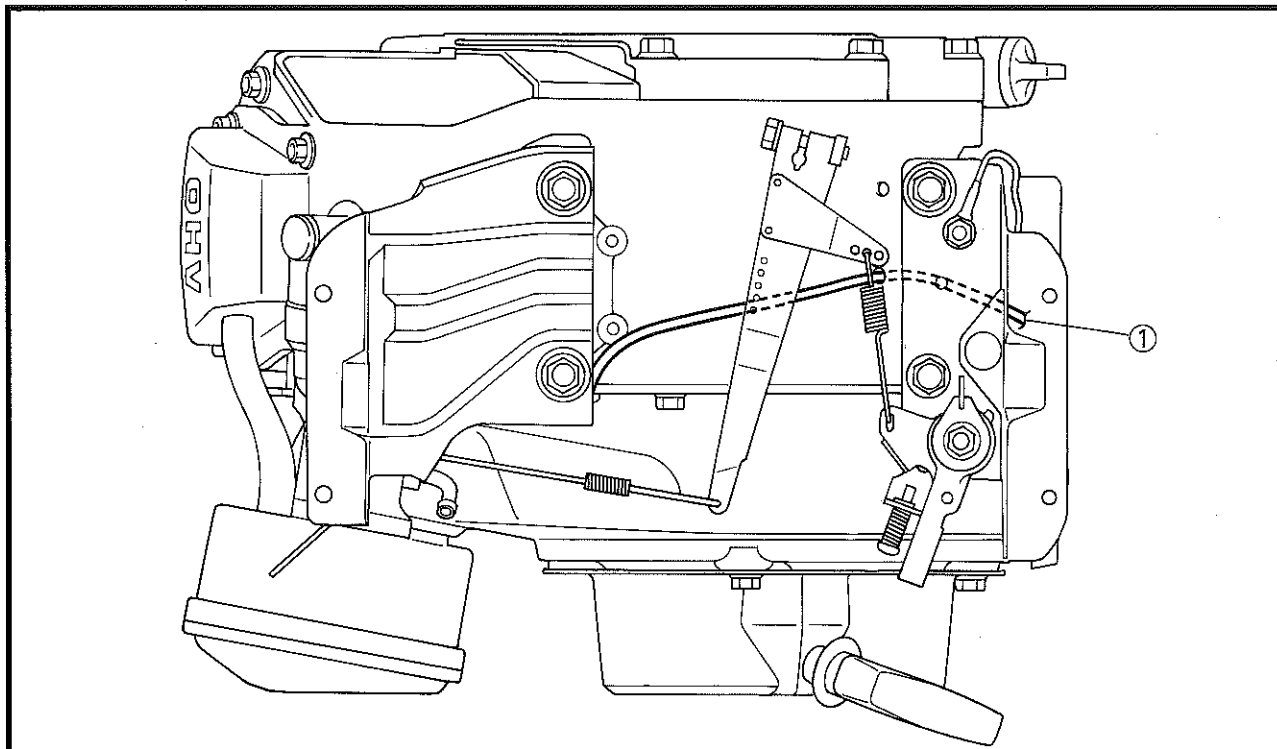
Thread size	Tightening torque		
	Nm	m • kg	ft • lb
M 4	2	0.2	1.4
M 5	3	0.3	2.2
M 6	7	0.7	5.1
M 7	10	1.0	7.2
M 8	15	1.5	10.8
M 10	35	3.0	21.7
M 12	60	6.0	43.4

DEFINITION OF UNITS

Unit	Read	Definition	Measure
mm cm	Millimeter Centimeter	10^{-3} meter 10^{-2} meter	Length Length
kg	Kilogram	10^3 gram	Weight
N	Newton	$1 \text{ kg} \times \text{m}/\text{sec}^2$	Force
Nm m • kg	Newton meter Meter kilogram	$\text{N} \times \text{m}$ $\text{m} \times \text{kg}$	Torque Torque
Pa N/mm	Pascal Newton per millimeter	N/m^2 N/mm	Pressure Spring rate
L cm ³	Liter Cubic centimeter	-	Volume or capacity
r/min	Rotation per minute	-	Engine speed

**CABLE ROUTING**

- ① Engine stop switch lead
- ② Engine stop switch
- ③ Oil level warning light
- ④ Oil warning unit



YAMAHA
YAMAHA MOTOR CO., LTD.

PRINTED ON RECYCLED PAPER

PRINTED IN JAPAN
96 • 4 - 0.3 × 1 CR
(英)