YAMAHA

Marine

Outboards

2B, 2C
2U

SERVICE MANUAL

LIT-18616-01-31

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NOTICE

This manual has been prepared by the Yamaha Motor Company primarily for use by Yamaha dealers and their trained mechanics when performing maintenance procedures and repairs to Yamaha equipment. It has been written to suit the needs of persons who have a basic understanding of the mechanical and electrical concepts and procedures inherent in the work, for without such knowledge attempted repairs or service to the equipment could render it unsafe or unfit for use.

Because the Yamaha Motor Company Ltd has a policy of continuously improving its products, models may differ in detail from the descriptions and illustrations given in this publication. Use only the latest edition of this manual. Authorized Yamaha dealers are notified periodically of modifications and significant changes in specifications and procedures, and these are incorporated in successive editions of this manual.

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2B, 2C
SERVICE MANUAL

1st Edition, June 1995

Printed in Japan
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HOW TO USE THIS MANUAL

MANUAL FORMAT

All of the procedures in this manual are organized in a sequential, step-by-step format. The information has been complied 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.

To assist you to find your way about this manual, the Section Title and Major Heading is given at the head of every page.

An Index to contents is provided on the first page of each Section.

MODEL INDICATION

Multiple models are shown in this manual. These indications are noted as follows.

Model name	2B	2C
USAand CANADA name	2MH	
Indication	2B	2C

THE ILLUSTRATIONS

Some illustrations in this manual may differ from the model you have. This is because a procedure described may relate to several models, though only one may be illustrated. (The name of model described will be mentioned in the description).

REFERENCES

These have been kept to a minimum; however, when you are referred to another section of the manual, you are told the page number to go to.

WARNINGS, CAUTIONS AND NOTES

Attention is drawn to the various Warnings, Cautions and Notes which distinguish important information in this manual in the following ways.

⚠ 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 outboard motor.

CAUTION:

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

NOTE:

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

HOW TO READ DESCRIPTIONS

1. A disassembly installation job mainly consists of the exploded diagram ①.

2. The numerical figures represented by the number ② indicates the order of the job steps.

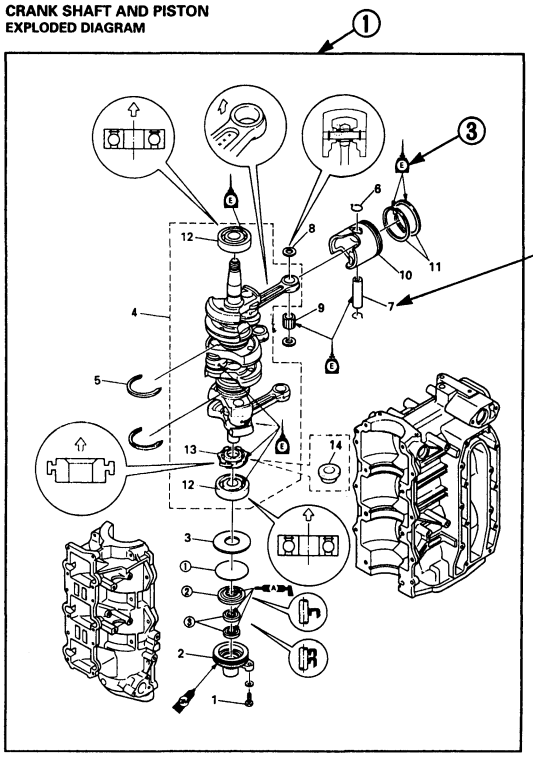
3. The symbols represented by the number ③ indicates the contents and notes of the job. For the meanings of the symbols, refer to the next page(s).

4. The REMOVAL AND INSTALLATION CHART ④ is attached to the exploded diagram and explains the job steps, part names, notes for the jobs, etc.

5. The SERVICE POINTS, other than the exploded diagram, explains in detail the items difficult to explain in the exploded diagram or REMOVAL AND INSTALLATION CHART, the Service points requiring the detailed description ⑤ ,etc.

POWR CRANK SHAFT AND PISTON

CRANK SHAFT AND PISTON
EXPLODED DIAGRAM



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④

POWR CRANK SHAFT AND PISTON

REMOVAL AND INSTALLATION CHART

Step	Procedure/Part name	Q'ty	Service points
	CRANK SHAFT AND PISTON REMOVAL		Follow the left "Step" for removal.
	Crank case		Refer to "CRANK CASE AND CYLINDER BODY" section in chapter 5.
1	Bolt (with washer)	1	6 × 20 mm
2	Oil seal housing	1	
3	Plane washer	1	
4	Crankshaft ass'y	1	**NOTE:** Remove the crankshaft by lightly tapping it with a plastic hammer.
5	Circlip	2	
6	Piston pin clip	6	**Always use the new clip.**
7	Piston pin	3	
8	Piston pin washer	6	**The washer should be placed with their convex sides facing the piston.**
9	Small end bearing needle	93	**Do not a mixture of new and used bearing needles in the same small end.**
10	Piston	3	
11	Piston ring	6	
12	Bearing	2	**When installing the bearing, the seal-cap side should be installed towards the flywheel side.**
13	Oil pump drive gear	1	Oil injection model **When installing the gear, the chamfered bore edge side should be installed towards the flywheel side.**
14	Spacer	1	Pre-mixed model
	OIL SEAL HOUSING DISASSEMBLY		
①	O-ring	1	
②	Oil seal	1	
③	Oil seal	2	
			Reverse the removal steps for installation.

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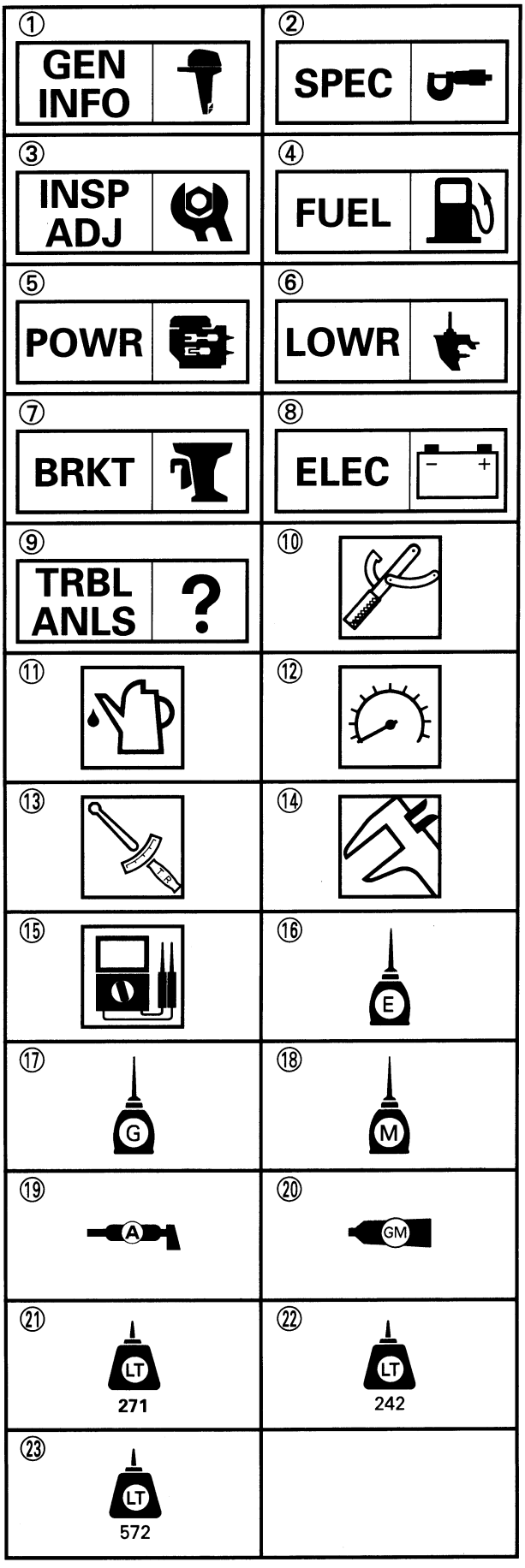

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SYMBOLS

Symbols ① to ⑨ are designed as thumb-tabs to indicate the content of a chapter.

① General Information
② Specifications
③ Periodic Inspection and Adjustment
④ Fuel System
⑤ Power Unit
⑥ Lower Unit
⑦ Bracket Unit
⑧ Electrical System
⑨ Trouble-analysis

Symbols ⑩ to ⑮ indicate specific data:

⑩ Special Tool
⑪ Specified liquid
⑫ Specified engine speed
⑬ Specified torque
⑭ Specified measurement
⑮ Specified electrical value
[Resistance (Ω), Voltage (V), Electric current (A)]

Symbol ⑯ to ⑲ in an exploded diagram indicate grade of lubricant and location of lubrication point:

⑯ Apply Yamaha 2-stroke outoboard motor oil
⑰ Apply Yamaha gear-case lubricant
⑱ Apply molybdenum disulfide oil
⑲ Apply water resistant grease (Yamaha grease A, Yamaha marine grease)

Symbols ⑳ to ㉓ in an exploded diagram indicate grade of sealing or locking agent, and location of application point:

⑳ Apply Gasket Maker®
㉑ Apply LOCTITE® No. 271 (Red LOCTITE)
㉒ Apply LOCTITE® No. 242 (Blue LOCTITE)
㉓ Apply LOCTITE® No. 572

NOTE:

In this manual, the above symbols may not be used in every case.

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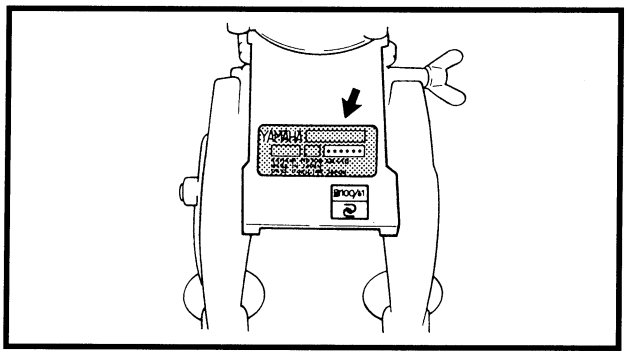
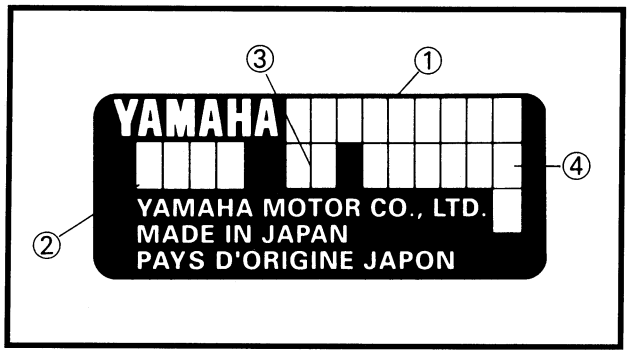
CHAPTER 1
GENERAL INFORMATION





IDENTIFICATION

SERIAL NUMBER

The serial number of the outboard motor is stamped on the label attached to the upper part of the swivel bracket.

NOTE:

For USA model:
As an antitheft measure, a special label on which the outboard motor serial number is stamped is bonded to the upper part of the swivel bracket. The label is specially treated so that peeling it off causes cracks across the serial number.

① Model name
② Approved model No.
③ Transom height
④ Serial number

STARTING SERIAL NUMBERS

The starting serial number blocks are as follows:

Model	Approved model No.	STARTING SERIAL No.
2B (2U)	6A1	173765~
2C	6F8	030425~

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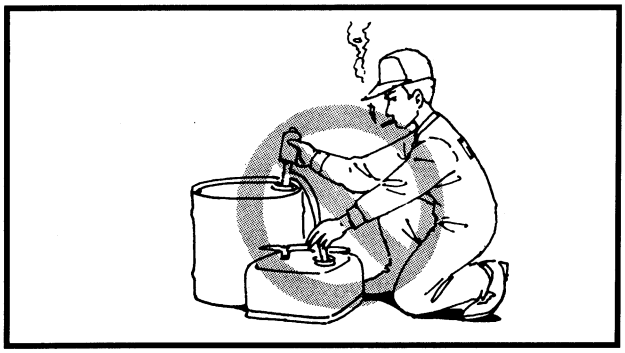
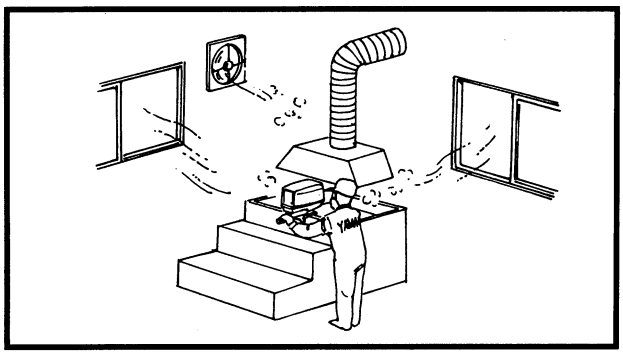
SAFETY WHILE WORKING

The procedures given in this manual are those recommended by Yamaha to be followed by Yamaha dealers and their mechanics.



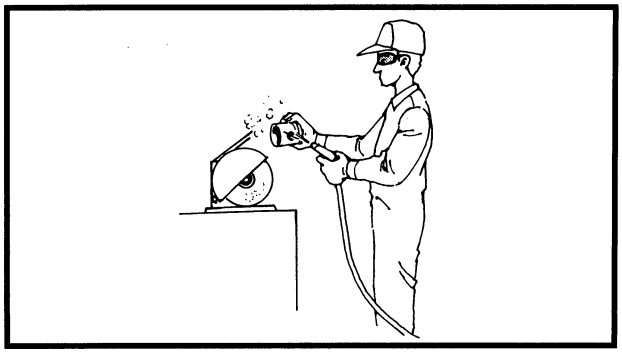
FIRE PREVENTION

Gasoline (petrol) is highly flammable.
Petroleum vapor is explosive if ignited. Do not smoke while handling petrol, and keep it away from heat, sparks, and open flames.



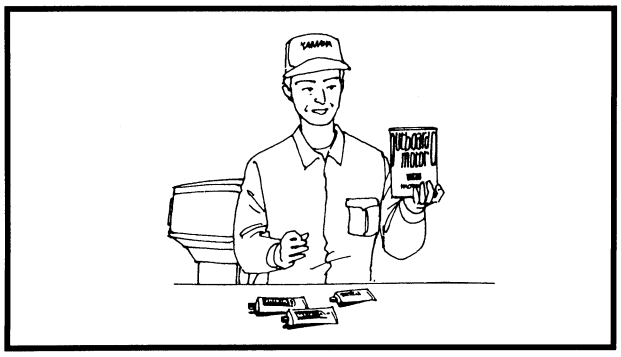
VENTILATION

Petroleum vapor is heavier than air and if inhaled in large quantities will not support life. Engine exhaust gases are harmful to breathe. When test-running an engine indoors, maintain good ventilation.



SELF-PROTECTION

Protect your eyes with suitable safety spectacles or safety goggles when using compressed air, when grinding or when doing any operation which may cause particles to fly off. Protect hands and feet by wearing safety gloves or protective shoes if appropriate to the work you are doing.



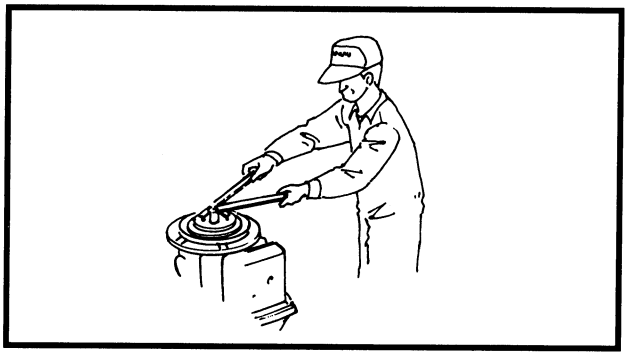
OILS, GREASES AND SEALING FLUIDS

Use only genuine Yamaha oils, greases and sealing fluids or those recommended by Yamaha.

Under normal conditions of use, there should be no hazards from the use of the lubricants mentioned in this manual, but safety is all-important, and by adopting good safety practises, any risk is minimized.

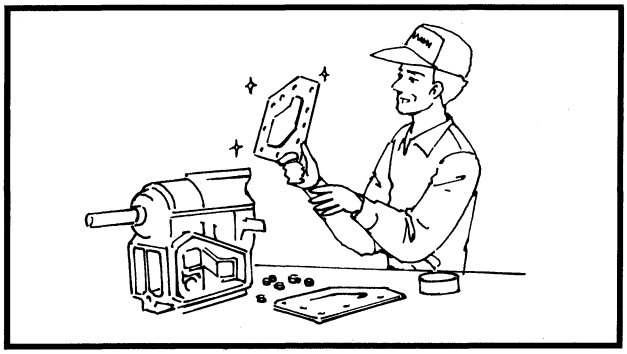
A summary of the most important precautions is as follows:

1. While working, maintain good standards of personal and industrial hygiene.
2. Clothing which has become contaminated with lubricants should be changed as soon as practicable, and laundered before further use.
3. Avoid skin contact with lubricants; do not, for example, place a soiled wiping-rag in one's pocket.
4. Hands, and any other part of the body which have been in contact with lubricants or lubricant-contaminated clothing, should be thoroughly washed with hot water and soap as soon as practicable.
5. To protect the skin, the application of a suitable barrier cream to the hands before working is recommended.
6. A supply of clean lint-free cloths should be available for wiping purposes.

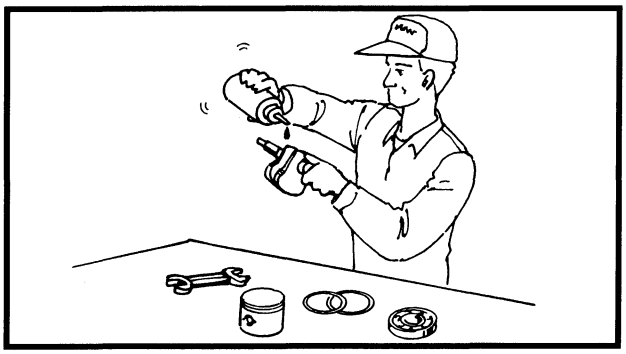


GOOD WORKING PRACTICES

1. The right tools
   Use the special tools that are advised to protect parts from damage. Use the right tool in the right manner- don't improvise.
2. Tightening torque
   Follow the torque tightening instructions. When tightening bolts, nuts and screws, tighten the larger sizes first, and tighten inner-positioned fixings before outer-positioned ones.

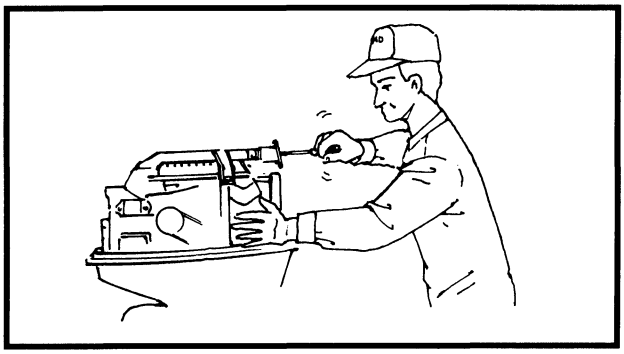


3. Non-reusable items
   Always use new gaskets, packing, O-rings, split-pins and circlips etc. on reassembly.



DISASSEMBLY AND ASSEMBLY

1. Clean parts with compressed-air on disassembling them.
2. Oil the contact surfaces of moving parts on assembly.



3. After assembly, check that moving parts operate normally.

4. Install bearings with the manufacturer's markings on the side exposed to view, and liberally oil the bearings.
5. When installing oil seals, apply a light coating of water-resistant grease to the outside diameter.

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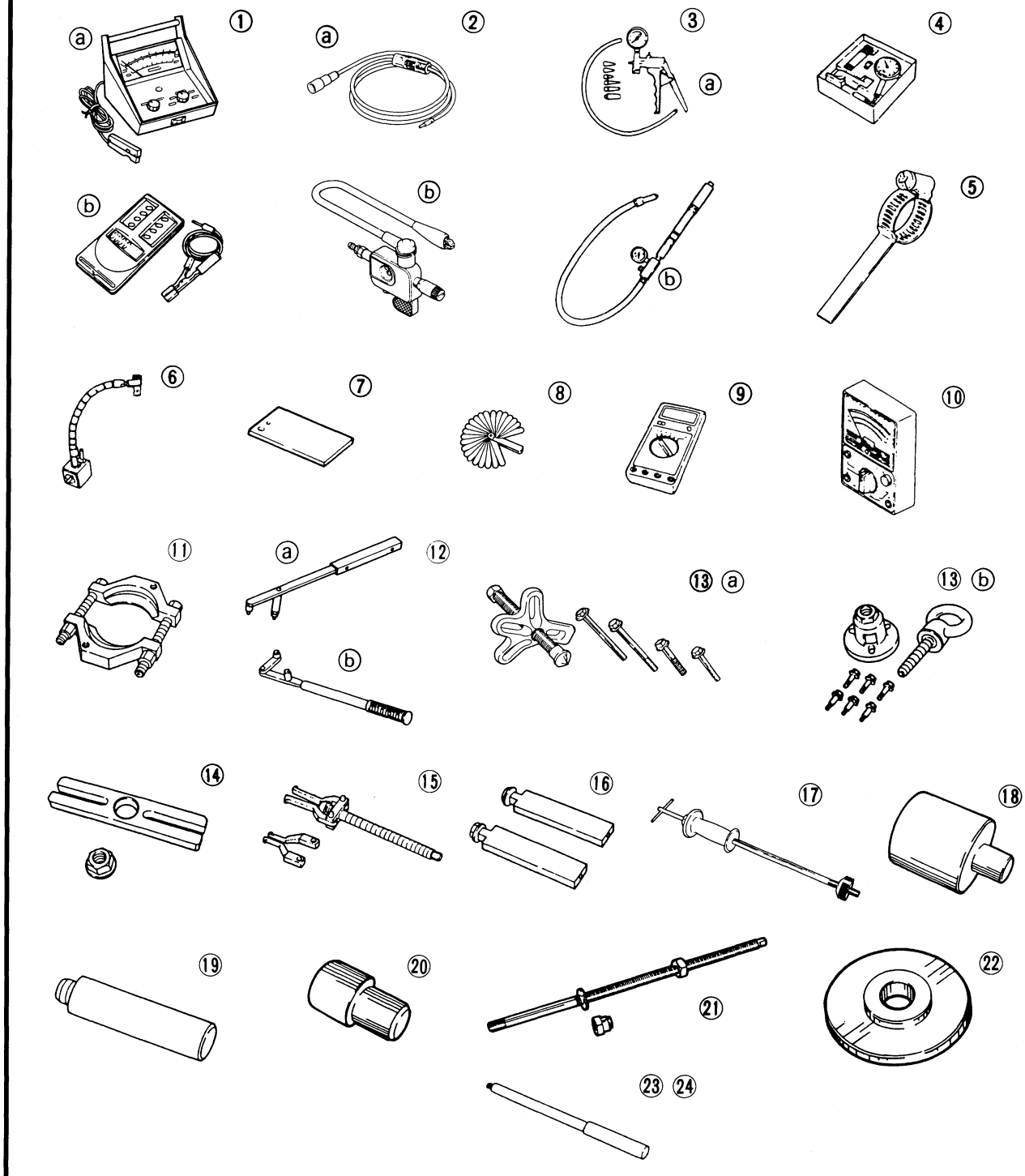
SPECIAL TOOLS

The use of correct special tools recommended by Yamaha will aid the work and enable accurate assembly and tune-up. Improvisations and use of improper tools can cause damage to the equipment.

NOTE:

- For U.S.A. and Canada, use part number starting with "YB-", "YU-" or "YW-".
- For others, use part number starting with "90890-".



SPECIAL TOOLS

MEASURING

	Tool name	Tool No.		Use for :
		USA and Canada ⓐ	Except for USA and Canada ⓑ	
1	Tachometer	YU-08036-A	90890-06760	Idle speed
2	Dynamic spark tester	YM-34487	90890-06754	Ignition system
3	Pressure tester	YB-35956	90890-06762	Lower case
4	Dial indicator	YU-03097	90890-01252	Backlash
5	Backlash indicator	YB-06265	90890-06265	Backlash
6	Magnetic flexible stand	YU-34481	90890-06705	Backlash
7	Backlash adjusting plate	YB-07003	N.A.	Backlash
8	Thickness gauge	YU-26900-9	N.A.	Shimming
9	Digital multimeter	YU-34899-A	90890-06752	Electrical
10	Pocket tester	YU-03112	90890-03112	Electrical

REMOVAL AND INSTALLATION

	Tool name	Tool No.		Use for :	
		USA and Canada ⓐ	Except for USA and Canada ⓑ		
11	Bearing separator	YB-06219	90890-06534	Crank shaft bearing	
12	Flywheel holder	YB-06139	90890-06522	Flywheel	
13	Flywheel puller	YB-06117	90890-06521	Flywheel	
14	Stopper guide plate	N.A.	90890-06501	Forward gear bearing	
15	Bearing outer race puller clow	N.A.	90890-06535	Forward gear bearing	
16	Stopper guide stand	N.A.	90890-06538	Forward gear bearing	
17	Slide hammer set	YB-06096	N.A.	Forward gear bearing	
18	Bearing installer	YB-06014	90890-06638	Forward gear bearing	
19	Driver rod - S	N.A.	90890-06606	Forward gear bearing	
20	Drive shaft bushing remover	YB-06027	90890-06651	Drive shaft bushing	
21	Bushing installer	YB-06029	90890-06601	Drive shaft bushing	
22	Needle bearing installer	YB-06169	N.A.	Drive shaft bushing	
23	Driver rod - L	YB-06071	90890-06605	Drive shaft bushing	
24	Driver rod - M10	YB-06229	90890-06652	Forward gear bearing	Drive shaft bushing

CHAPTER 2
SPECIFICATIONS

GENERAL SPECIFICATIONS

Item	Unit	Model	
		2B	2C
Approved model No.		6A1	6F8
DIMENSION:			
Over-all length	mm (in)	607 (23.9)	
Over-all width	mm (in)	214 (8.4)	
Over-all height	mm (in)	916 (36.1)	
Boat transom height	mm (in)	381 (15.0)	
WEIGHT:			
Weight (PL)	kg (lb)	10 (22.0)	9.8 (21.6)
PERFORMANCE:			
Output (ISO)	kW (hp) / rpm	1.5 (2) / 4500	
Full throttle operating range	rpm	4000~5000	
Maximum fuel consumption	L (US gal , Imp gal)/h at rpm	1.3 (0.34,0.29) at 5000	1.4 (0.37,0.31) at 5000
ENGINE:			
Type		2 stroke	
Number of cylinder		1	
Bore X Stroke	mm (in)	39.0 x 36.0 (1.54 x 1.42)	42.0 x 36.0 (1.65 x 1.42)
Total displacement	cm^3 (cu.in)	43 (2.62)	50 (3.05)
Compression ratio		7.40	8.30
Number of carburetor		1	
Intake system		Reed valve	
Scavenging system		Loop charge	
Control system		Tiller control	
Starting system		Manual	
Ignition system		CDI	
Enrichment system		Choke valve	
Advance type		Fixed	
Spark plug (NGK)		B5HS	B7HS
for CANADA and Europe		BR5HS	–
Exhaust system		Under water	
Cooling system		Water	
Lubrication system		Pre-mixed fuel & Oil	

GENERAL SPECIFICATIONS

Item	Unit	Model	
		2B	2C
FUEL AND LUBRICATION:			
Fuel type		Reguler gasoline	
Fuel tank capacity	L (US gal, Imp gal)	1.2 (0.32,0.26)	
Engine oil type / Grade		TC-W3	
Gear oil type		2-Stroke outboard motor oil / TC-W3	
Gear oil quantity	cm^3 (US oz, Imp oz)	45 (1.52,1.58)	
Mixing ratio		100:1(GEN 50:1)	
BRACKET:			
Tilt Angle	degree	4,8,12,16	
Tilt-up Angle	degree	73	
Steering Angle	degree	360	
DRIVE UNIT:			
Gear Shift Position		Forword	
Gear Ratio		2.08 (27/13)	
Gear Type		Zerol gear	
Clutch Type		NA	
Propeller Direction		Clockwise	
Propeller Drive System		Shear Pin	
Propeller Series Mark		A	

MAINTENANCE SPECIFICATIONS
ENGINE

Item	Unit	Model	
		2B	2C
CYLINDER HEAD:			
Warpage limit	mm (in)	0.1 (0.004)	
CYLINDER:			
Bore size	mm (in)	39.00~39.02 (1.535~1.536)	42.00~42.02 (1.654~1.654)
Wear limit	mm (in)	39.10 (1.54)	42.10 (1.66)
Taper limit	mm (in)	0.08 (0.003)	
Out of round limit	mm (in)	0.05 (0.002)	
PISTON:			
Piston clearance	mm (in)	0.030~0.035 (0.0012~0.0014)	
Limit	mm (in)	0.085 (0.0033)	
Diameter	mm (in)	38.967~38.986 (1.5341~1.5349)	41.970~42.000 (1.6524~1.6535)
Measuring point H	mm (in)	10 (0.39)	
Pin boss inside diameter	mm (in)	10.004 ~ 10.015 (0.3939 ~ 0.3943)	
Ring groove clearance Top	mm (in)	0.03~0.07 (0.001~0.003)	0.02~0.06 (0.001~0.002)
Ring groove clearance 2nd	mm (in)	0.03~0.07 (0.001~0.003)	
Over size diameter 1st*	mm (in)	39.25 (1.545)	42.25 (1.663)
Over size diameter 2nd	mm (in)	39.50 (1.555)	42.50 (1.673)
PISTON PIN:			
Diameter	mm (in)	9.996~10.000 (0.3935~0.3937)	
PISTON RING (TOP):			
Type		Plain	Keystone
Dimensions (B x T)	mm (in)	2.0x1.8 (0.08x0.07)	
End gap (Installed)	mm (in)	0.10~0.30 (0.004~0.012)	
Limit	mm (in)	0.50 (0.020)	
PISTON RING (2nd):			
Type		Plain	Barrel
Dimensions (B x T)	mm (in)	2.0x1.8 (0.08x0.07)	
End gap (Installed)	mm (in)	0.10~0.30 (0.004~0.012)	
Limit	mm (in)	0.50 (0.020)	
CONNECTING ROD:			
Small end diameter	mm (in)	14.000~14.011 (0.5512~0.5516)	
CRANK SHAFT ASSEMBLY:			
Crank width A	mm (in)	27.90~27.95 (1.098~1.100)	
Runout limit D	mm (in)	0.02 (0.001)	
Big end side clearance E	mm (in)	0.30~0.60 (0.012~0.024)	
Small end axial play limit F	mm (in)	2.0 (0.08)	
REED VALVE:			
Valve stopper height	mm (in)	6.0±0.2 (0.24±0.01)	
Valve warpage limit	mm (in)	0.3 (0.01)	

*:Except for U.S.A.

MAINTENANCE SPECIFICATIONS

Item	Unit	Model	
		2B	2C
CARBURETOR:			
Identification mark		6A103	6F803
Float height	mm (in)	17.3±0.5 (0.68±0.02)	
Valve seat size	mm (in)	1.4 (0.06)	
Main jet (M.J.)	#	96	104
Jet needle (J.N.)	#	167	166
Cut away (C.A.)	#	0.75	
ENGINE SPEED:			
Idle speed	rpm	1,150±50	
RECOIL STARTER:			
Starter rope length	mm (in)	1,300± (51.2)	

LOWER

Item	Unit	Model	
		2B	2C
GEAR BACKLASH:			
Pinion - Forward (S.S.T.)	mm	0.27~0.99	
Pinion shims	mm	0.3, 0.4, 0.5	
Propeller size (Aluminium)		3 x 7-1/4 x 4-1/2	
		3 x 7-1/4 x 5-1/2	3 x 7-1/4 x 5
		–	3 x 7-1/4 x 5-1/2
Propeller size (Plastic)		3 x 7-1/4 x 4	
Test propeller 1		90890-01601,YB-1601	
	rpm	4,400~4,700	

ELECTRICAL

Item	Unit	Model 2B	Model 2C
IGNITION TIMING:			
Ignition timing (full advanced)	Degree	B.T.D.C. 18±2	
Piston position (full advanced)	mm (in)	B.T.D.C. 1.11 +0.26 -0.23 (0.044 +0.010 -0.009)	
STATOR ASSEMBLY:			
Charge coil resistance	Ω (color)	316.8~387.2 (Brown-Earth)	
Pole number		4	

CDI UNIT:

Unit: kΩ

⊖ \ ⊕	W	B	Br	O
W		•	∞	•
B	2.2~9.5		2.2~9.5	•
Br	∞	•		•
O	7~30	2~9	7~30	

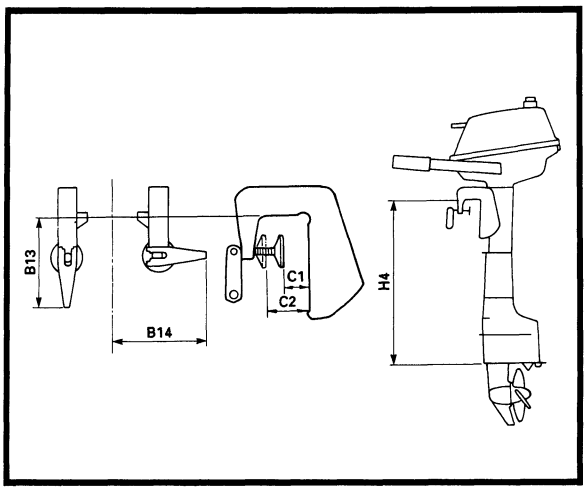
NOTE:

- The resistance values will vary from meter to meter, especially with electronic digital meters. For some testers, polarity of leads is reversed.
- "•" indicates that the pointer deflects once and returns to specification.
- "∞" mark indicates discontinuity.

Item	Unit	Model 2B	Model 2C
IGNITION COIL:			
Type (single / twin)		Single	
Primary coil resistance	Ω (color)	0.18~0.24 (Orange-Black)	
Secondarily coil resistance	kΩ (color)	2.7~3.7 (Black/White-High tension cord)	
SPARK PLUG CAP:			
Type		Standard	
Type (for Canada and Europe)		Resistance	–
SPARK PLUG:			
Gap	mm (in)	0.6~0.7 (0.024~0.028)	

DIMENSION

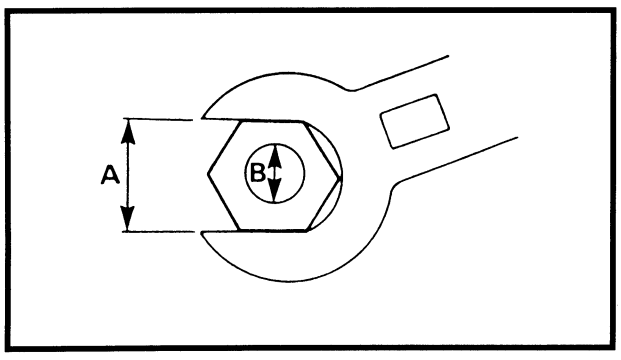
Item	Unit	Model 2B	Model 2C
H4	mm (in)	417 (16.4)	
B13	mm (in)	100 (3.9)	
B14	mm (in)	95 (3.7)	
C1	mm (in)	23 (0.9)	
C2	mm (in)	60 (2.4)	



TIGHTENING TORQUE
SPECIFIED TORQUE

Part to tightened		Part name	Thread size	Q'ty	Tightening torque			Remarks
					Nm	m•Kg	ft•lb	
ENGINE:								
Flywheel magneto		Nut	M10	1	45	4.5	32	③
Intake manifold	1st	Bolt	M6	4	5	0.5	3.6	
	2nd				10	1.0	7.2	
Reed valve		Bolt	M4	2	1	0.1	0.7	
Spark plug		Bolt	M14	1	25	2.5	18	
Cylinder head	1st	Bolt	M6	4	5	0.5	3.6	⑤ 572
	2nd				10	1.0	7.2	
Crankcase	1st	Bolt	M6	2	5	0.5	3.6	⑤ 572
	2nd				10	1.0	7.2	
BRACKET:								
Clamp bracket		Nut	M8	1	16	1.6	11	

Nut A	Bolt B	General torque specifications		
		Nm	m·kg	ft·lb
8 mm	M5	5.0	0.5	3.6
10 mm	M6	8.0	0.8	5.8
12 mm	M8	18	1.8	13
14 mm	M10	36	3.6	25
17 mm	M12	43	4.3	31



GENERAL TORQUE

This chart specifies the torques for tightening standard fasteners with standard clean dry ISO threads at room temperature. Torque specifications for special components or assemblies are given in applicable sections of this manual. To avoid causing warpage, tighten multifastener assemblies in criss-cross fashion, in progressive stages until the specified torque is reached.

CHAPTER 3
PERIODIC INSPECTION AND ADJUSTMENT

MAINTENANCE INTERVAL CHART

The following chart should be considered strictly as a guide to general maintenance intervals. Depending on operating conditions, the intervals of maintenance should be changed.

Item	Remarks	Initial		Every		Refer page
		10 hours (Break-in)	50 hours (3 months)	100 hours (6 months)	200 hours (1 year)	
FUEL SYSTEM:						
Fuel hose	Inspection			O		4-2
Fuel tank	Cleaning			O	O	4-2
Fuel cock filter element	Cleaning			O	O	4-2
Carburetor	Cleaning	O	O	O		4-7
POWER UNIT:						
Water leakage	Inspection		O	O		–
Motor exterior	Inspection		O	O		–
Exhaust leakage	Inspection	O	O	O		–
Cooling water passage	Cleaning		O	O		–
CONTROL SYSTEM:						
Idle speed	Inspection/Adjustment			O		3-2
LOWER UNIT:						
Gear oil	Change	O		O		3-2
Lower unit leakage	Inspection				O	3-3
Cotter pin and shear pin	Inspection		O	O		6-2
Propeller	Inspection		O	O		6-2
GENERAL:						
Anode	Inspection	O	O	O		3-4
Spark plug	Cleaning / Adjustment Replacement	O	O	O		3-4
Wiring and connector	Adjustment/Reconnect	O	O	O		–
Bolts and nuts	Retightening	O		O		–
Grease points	Greasing			O		3-5

PERIODIC SERVICE
CONTROL SYSTEM

Idle speed adjustment

1. Measure:
   •Idle speed
   Out of specification → Adjust.

	Idle speed: **1,150 ± 50 rpm**

Measuring steps:
•Start the engine and allow it to warm up for a few minutes.
•Attach the tachometer to the high tension lead.

	Tachometer: **YU-08036-A/90890-06760**

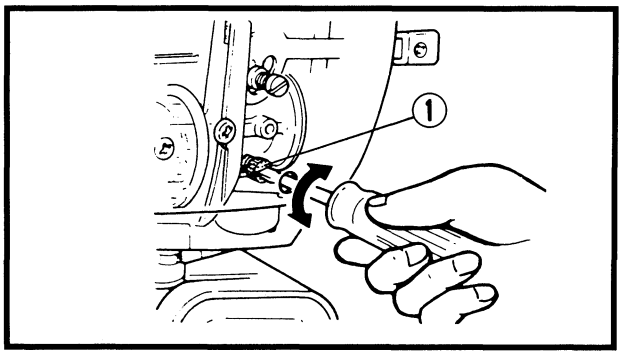
2. Adjust:
   •Idle speed

Adjustment steps:
•Start the engine and allow it to warm up for a few minutes.
•Attach the tachometer to the high tension lead.

	Tachometer: **YU-08036-A/90890-06760**

•Adjust the idle adjusting screw ① in or out until specified idle speed is obtained.

Turning in → Idle speed becomes higher.
Turning out → Idle speed becomes lower.

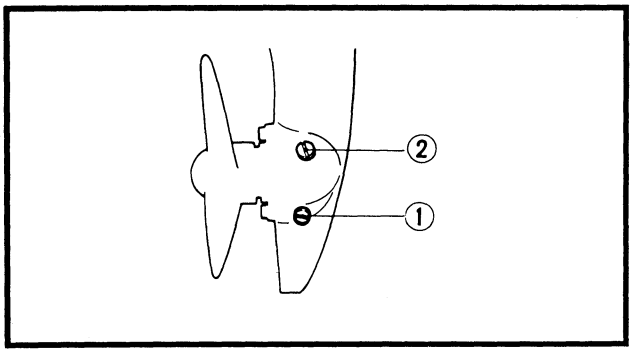


LOWER UNIT

Gear oil

1. Check:
   •Gear oil
   Milky oil → Replace the oil seal.
   Slag oil → Check the gear, bearing and dog.

2. Check:
   •Gear oil level
   Oil level is low → Add oil to proper level.
3. Replace:
   •Gear oil



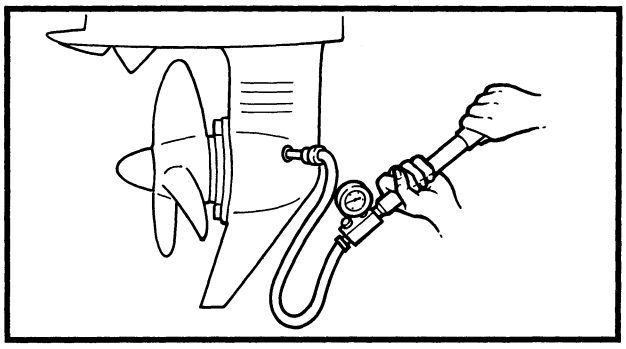
Replacement steps:
•Place the outboard motor in an upright position.
•Place a pan under the drain plug.
•Remove the drain plug ①, then the oil level plug ② and drain the oil thoroughly.
•Fill the gear oil through the drain hole until it overflows at the level hole.

Recommended oil:
GEAR CASE LUBE (USA) or Hypoid gear oil, SAE #90
Oil capacity:
45 cm³ (1.52 US oz, 1.58 Imp oz)

•Refit the oil level plug and then oil drain plug.

Lower unit leakage check

1. Check:
   •Pressure holding
   Pressure falls → Inspect seals and component parts.



Checking steps:
•Attach the tester to the oil-level hole.

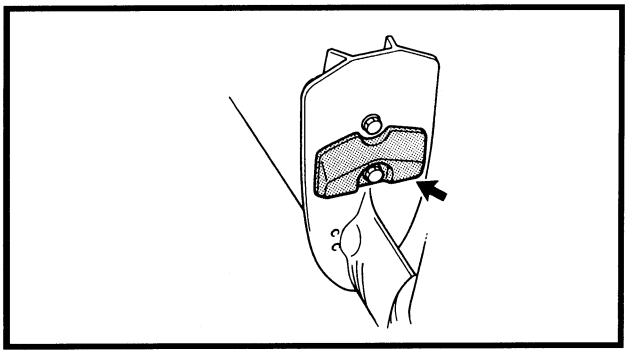
Pressure tester:
YB-03595/90890-06762

•Apply the specified pressure.

Pressure:
100 kPa (1.0 kg/cm², 14.2 psi)

•Check that the pressure is held at the specified pressure for 10 seconds.

CAUTION:
Do not over-pressurize. Excess pressure may cause the air to leak out.



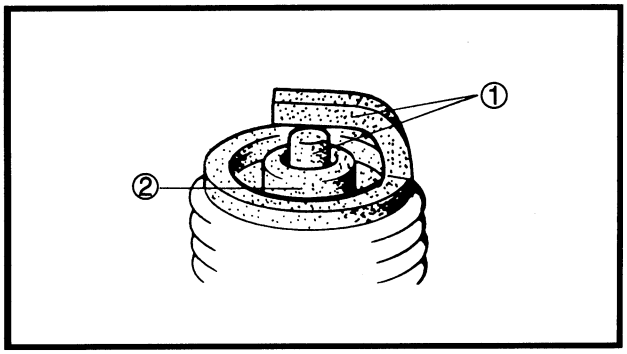
GENERAL

Anode

1. Inspect:
   •Anode
   Scale → Clean
   Oil/grease → Clean
   Corrosion → Replace

CAUTION:

Do not oil, grease or paint the anode, or the function of the sacrificial anode will be spoiled.



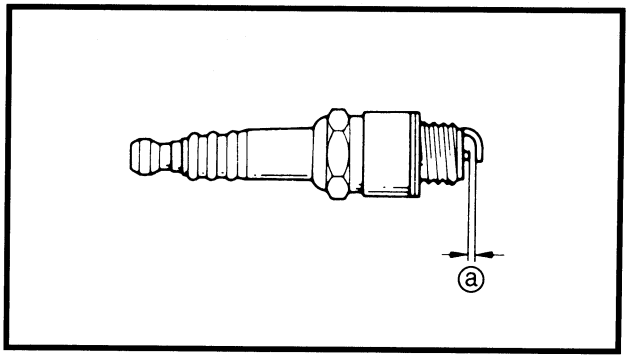
Spark plug

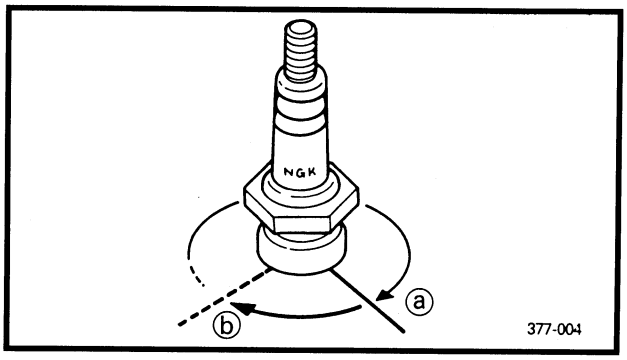
1. Inspect:
   •Electrode ①
   Wear/Damage → Replace
   •Insulator color ②
   Distinctly different color → Check the engine condition

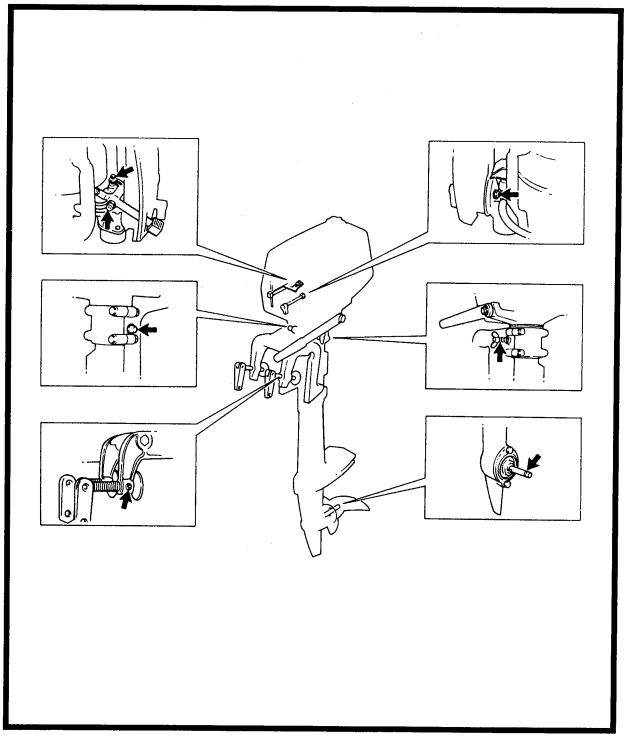
Color guide:
Normal:
Medium to light tan color
Whitish color:
- **Lean fuel mixture**
- **Plugged fuel mixture**
- **Air leak**
- **Wrong setting**

Blackish color:
- **Electrical malfunction**
- **Defective spark plug**
- **Defective ignition system**
- **Rich mixture**
- **Excessive idling**

2. Clean:
   •Spark plug
   Clean the spark plug with a plug cleaner or wire brush.







3. Inspect:
   •Spark plug type

Standard spark plug:
2B : B5HS
For CANADA and Europe:
BR5HS
2C : B7HS

4. Measure:
   •Electrodes gap ⓐ
   Out of specification → Regap.

Gap:
0.6 ~ 0.7 mm (0.024 ~ 0.028 in)

5. Tighten:
   •Spark plug

NOTE:

Before installing the spark plug, clean the gasket surface and the plug surface.

Spark plug:
25Nm (2.5m•kg, 18ft•lb)

NOTE:

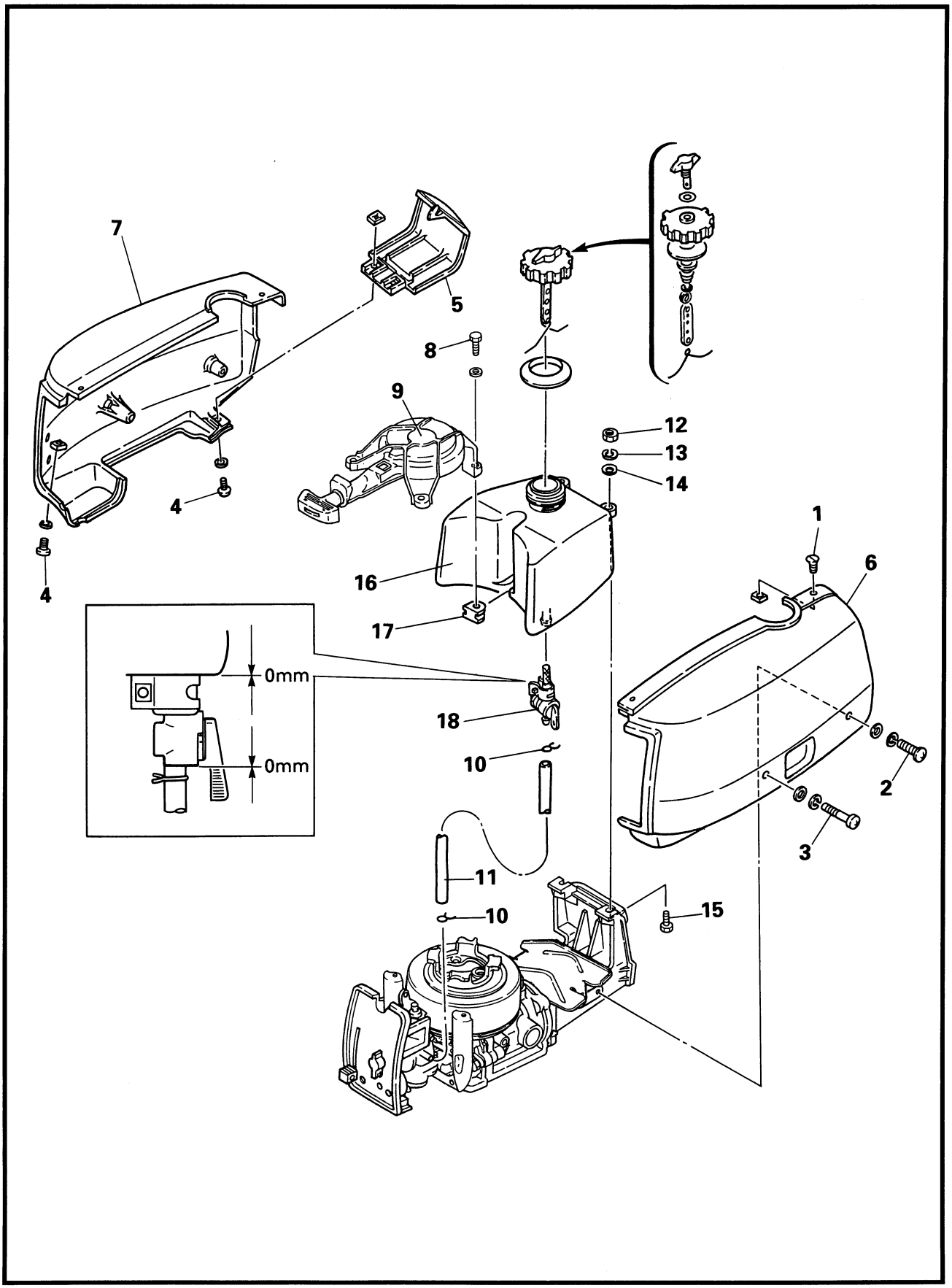
If a torque wrench is not available, a good estimate of the correct torque is a further 1/4 to 1/2 turns ⓑ on finger-tightened ⓐ spark plug.

Grease points

1. Apply:
   •Water resistant grease

CHAPTER 4
FUEL SYSTEM

FUEL TANK AND FUEL COCK
EXPLODED DIAGRAM



FUEL TANK AND FUEL COCK

REMOVAL AND INSTALLATION CHART

Step	Procedure/Part name	Q'ty	Service points
	FUEL TANK AND FUEL COCK REMOVAL		Follow the left "Step" for removal.
1	Screw	2	
2	Screw (with washer)	2	6 x 25 mm
3	Screw (with washer)	2	6 x 40 mm
4	Screw (with washer)	4	5 x 10 mm
5	Plug cap cover	1	
6	Apron (left)	1	
7	Apron (right)	1	
8	Bolt (with washer)	3	6 x 16 mm
9	Recoil starter assembly	1	
10	Clip	2	
11	Fuel hose (fuel cock - carburetor)	1	
12	Nut	2	
13	Spring washer	2	
14	Plain washer	2	
15	Bolt	2	6 x 18 mm
16	Fuel tank assembly	1	
17	Grommet	1	
18	Fuel cock	1	
			Reverse the removal steps for installation.

SERVICE POINTS

Fuel hose inspection

1. Inspect:
   - •Fuel hose
     Crack/Leak/Damage → Replace.
     Clog → Clean.

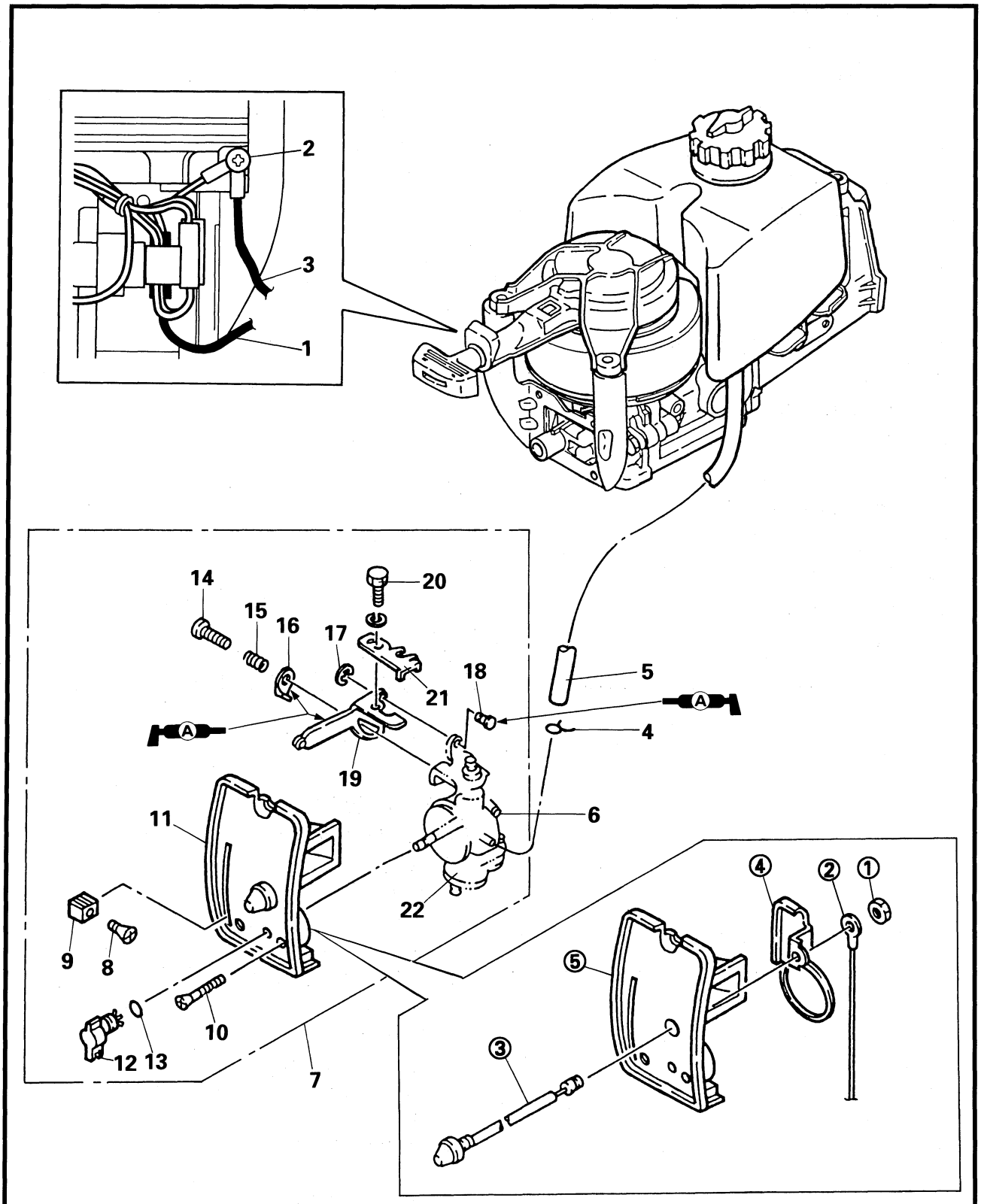
Fuel tank inspection

1. Inspect:
   - •Fuel tank
   - •Fuel tank cap
     Crack/Leak/Damage → Replace.
     Dirt → Clean.

Fuel cock inspection

1. Inspect:
   - •Fuel cock filter element
     Crack/Leak → Replace.
     Clog → Clean.

CARBURETOR REMOVAL
EXPLODED DIAGRAM

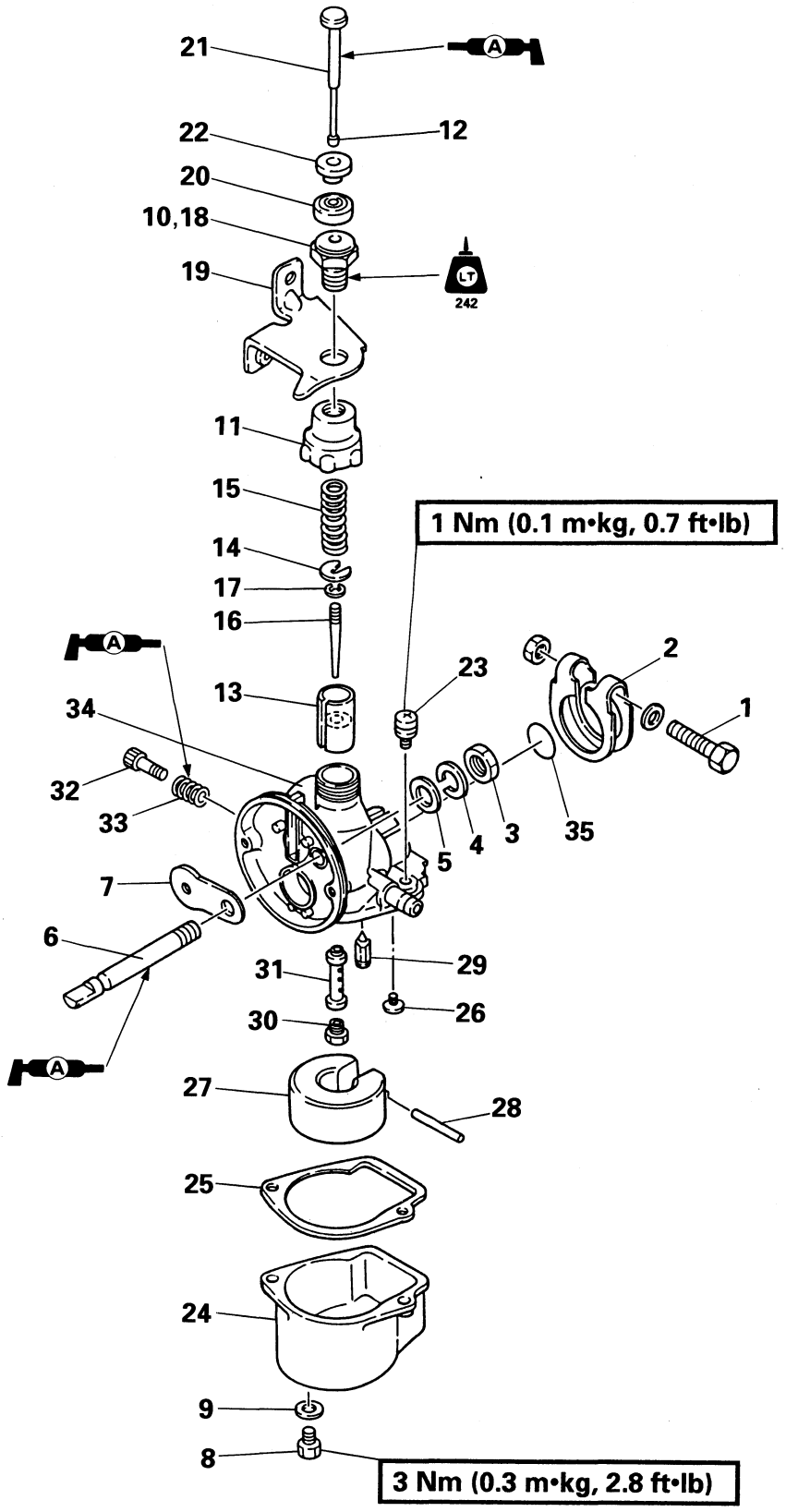


CARBURETOR REMOVAL

REMOVAL AND INSTALLATION CHART

Step	Procedure/Part name	Q'ty	Service points
	CARBURETOR REMOVAL		Follow the left "Step" for removal.
	Apron		Refer to "FUEL TANK AND FUEL COCK".
1	Stop switch lead (white)	1	
2	Screw	1	5 x 8 mm
3	Ground lead (black)	1	
4	Clip	1	
5	Fuel hose (fuel cock - carburetor)	1	
6	Screw	1	
7	Carburetor assembly	1	
8	Screw	1	
9	Throttle lever knob	1	
10	Screw	2	4 x 35 mm
11	Silencer cover assembly	1	
12	Chock knob	1	
13	O-ring	1	
14	Screw	1	5 x 25 mm
15	Spring	1	
16	Plate	1	
17	Circlip	1	
18	Pin	1	
19	Accelation arm	1	
20	Bolt (with washer)	1	5 x 10 mm
21	Throttle lever link	1	
22	Carburetor assembly	1	
	SILENCER COVER DISASSEMBLY		
①	Nut	1	
②	Ground lead	1	
③	Stop switch	1	
④	Bracket	1	
⑤	Silencer cover	1	
			Reverse the removal steps for installation.

CARBURETOR
EXPLODED DIAGRAM



CARBURETOR

REMOVAL AND INSTALLATION CHART

Step	Procedure/Part name	Q'ty	Service points
	CARBURETOR DISASSEMBLY		Follow the left "Step" for removal.
	Carburetor assembly		Refer to "CARBURETOR REMOVAL".
1	Screw	1	
2	Clamp	1	
3	Nut	1	
4	Spring washer	1	
5	Plane washer	1	
6	Choke valve shaft	1	
7	Choke valve	1	
8	Drain screw	1	
9	Gasket	1	
10	Throttle screw	1	**NOTE:** Loosen the throttle screw.
11	Mixing chamber screw	1	
12	Throttle bar barrel	1	
13	Throttle valve	1	
14	Spring seat	1	
15	Spring	1	
16	Jet needle	1	
17	Circlip	1	
18	Throttle screw	1	
19	Throttle link bracket	1	
20	Cap	1	
21	Throttle bar	1	
22	Spacer	1	
23	Screw	2	
24	Float chamber	1	
25	Float chamber gasket	1	
26	Screw	1	
27	Float	1	
28	Float pin	1	
29	Needle valve	1	
30	Main jet	1	
31	Main nozzle	1	
32	Idle adjusting screw	1	
33	Spring	1	
34	Carburetor body	1	
35	O-ring	1	
			Reverse the removal steps for installation.

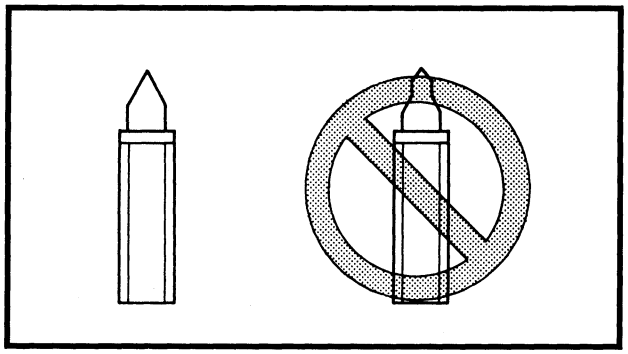
SERVICE POINTS

CAUTION:

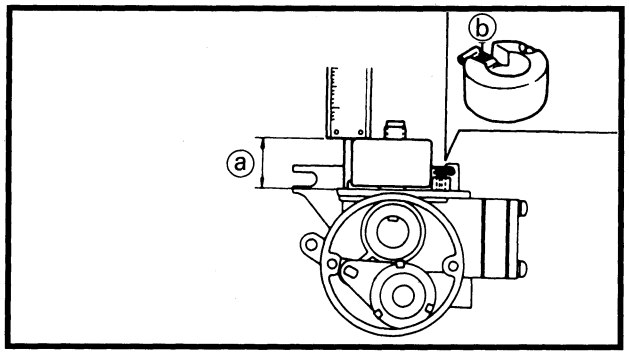
Do not use steel wire for cleaning the jets as this may enlarge the jet diameters and seriously affect performance.

Carburetor inspection

1. Inspect:
   - •Carburetor body
     Crack/Damage → Replace.
     Contamination → Clean.
2. Inspect:
   - •Jet needle
     Bend/Wear → Replace.
3. Inspect:
   - •Main jet
   - •Main nozzle
     Contamination → Clean.



4. Inspect:
   - •Needle valve
     Grooved wear → Replace.
5. Inspect:
   - •Float
     Crack/Damage → Replace.



6. Measure:
   - •Float height ⓐ
     Out of specification → Fold the tab ⓑ to adjust float arm height.

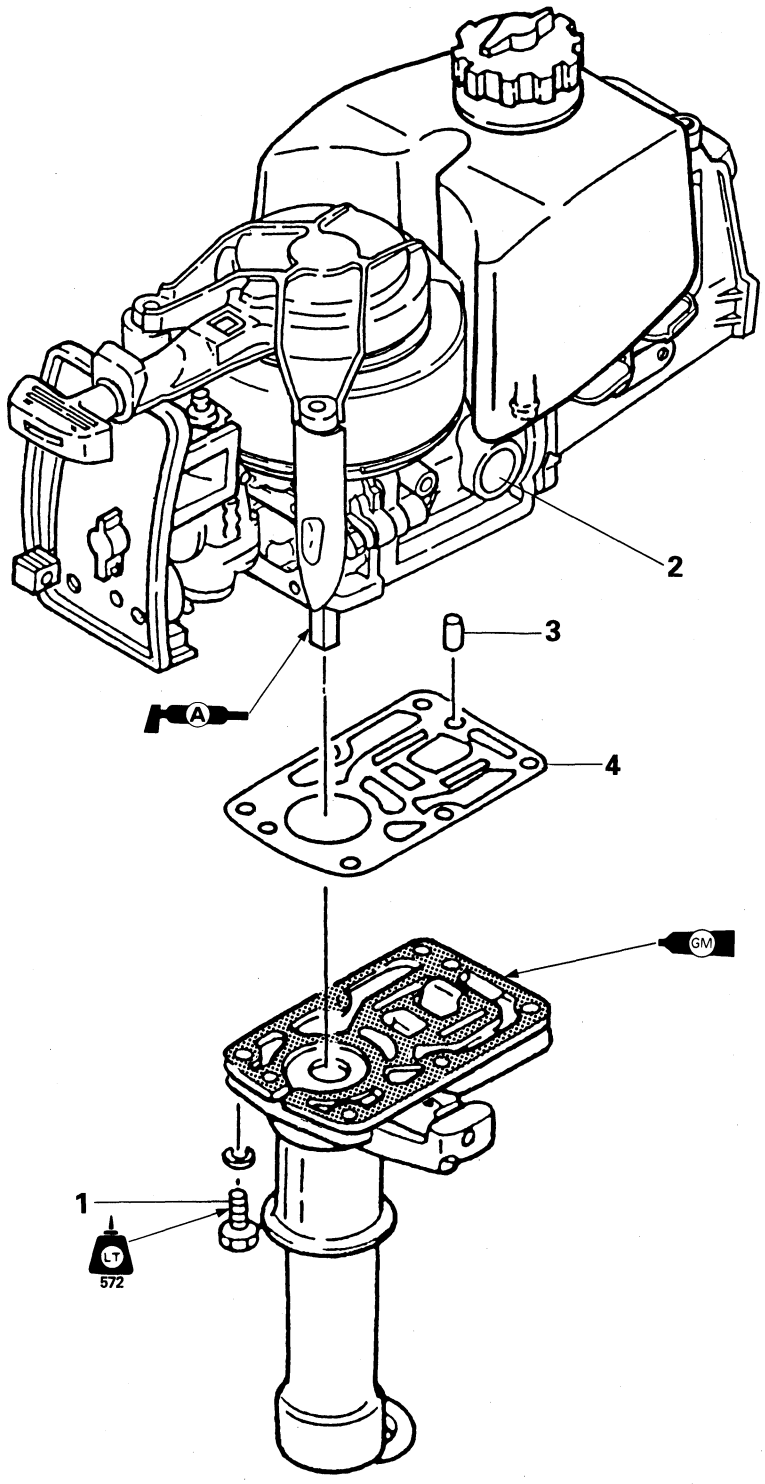
Float height:
17.3 ± 0.5 mm (0.68 ± 0.02 in)

NOTE:

- •The float should be resting on the needle valve, but not compressing the needle valve.
- •Take measurement at the end surface of the float opposite to its pivoted side.

CHAPTER 5
POWER UNIT

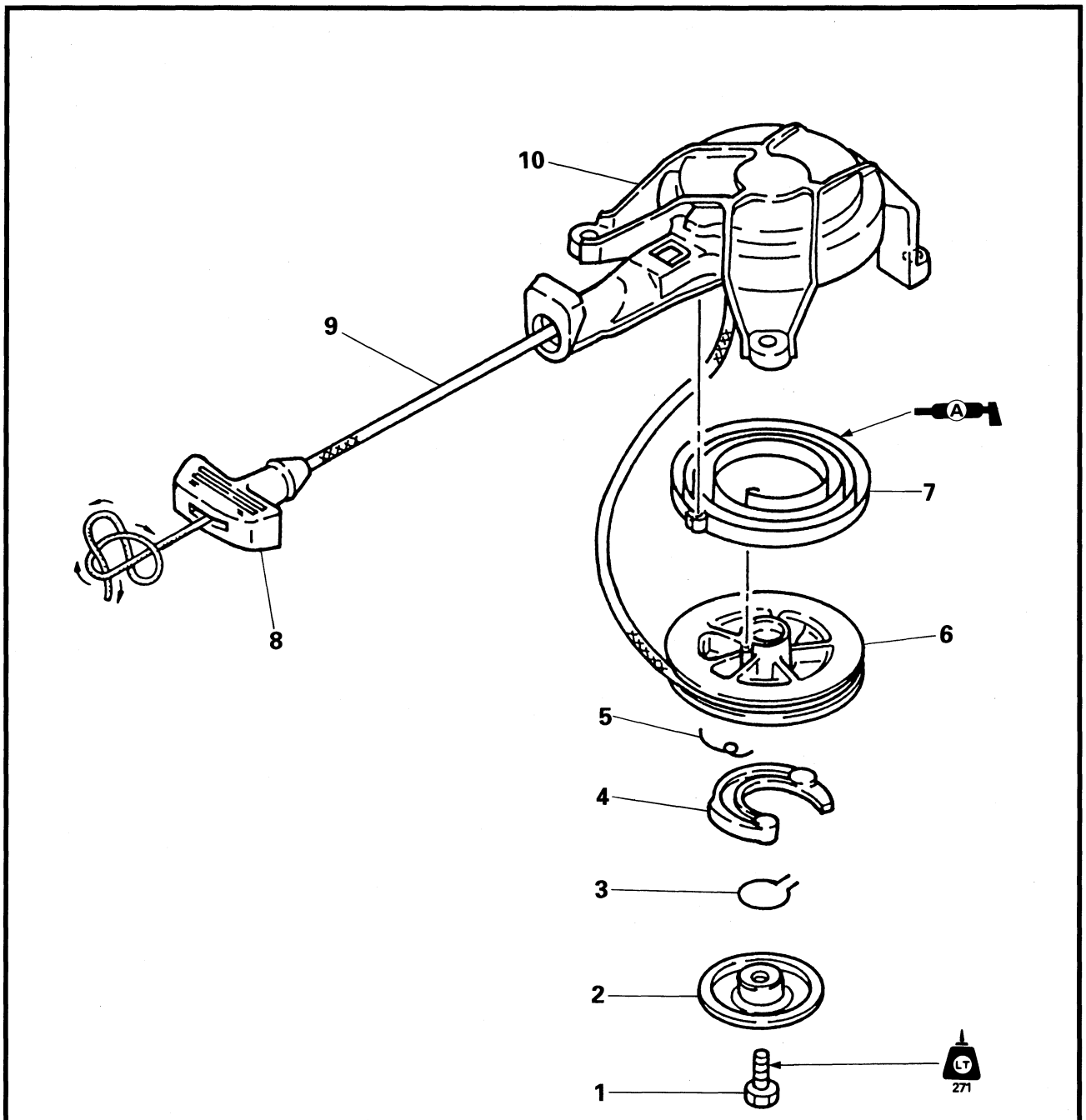
POWER UNIT REMOVAL
EXPLODED DIAGRAM

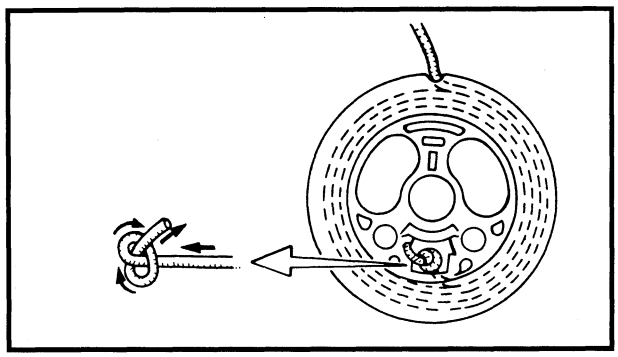


REMOVAL AND INSTALLATION CHART

Step	Procedure/Part name	Q'ty	Service points
	POWER UNIT REMOVAL		Follow the left "Step" for removal.
	Apron		Refer to "FUEL TANK AND FUEL COCK" section in chapter 4.
1	Bolt (with washer)	6	6 x 25 mm **NOTE:** Tighten the bolts in two steps of torque.
2	Engine unit	1	**NOTE:** Film-coat the exhaust guide mating surface with Gasket Maker or equivalent.
3	Dowel pin	2	
4	Upper case gasket	1	
			Reverse the removal steps for installation.

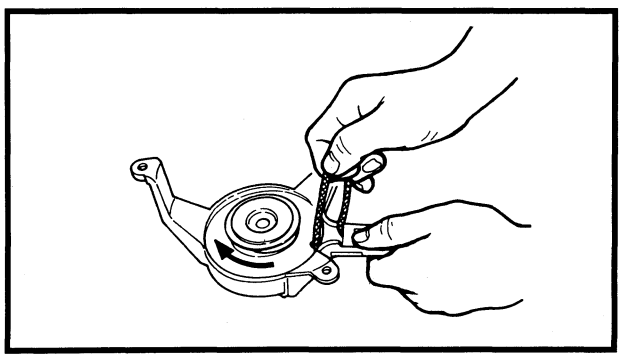
RECOIL STARTER
EXPLODED DIAGRAM





REMOVAL AND INSTALLATION CHART

Step	Procedure/Part name	Q'ty	Service points
	RECOIL STARTER DISASSEMBLY		Follow the left "Step" for removal.
	Recoil starter assembly		Refer to "FUEL TANK AND FUEL COCK" section in chapter 4.
1	Bolt	1	
2	Drive plate	1	
3	Drive pawl spring	1	
4	Drive pawl	1	
5	Spring	1	
6	Sheave drum	1	
7	Spiral spring	1	**NOTE:** •When installing the new spiral spring, do not cut the wire holding the spring. •When reusing the spiral spring, set the leading end first in the case and then fit one turn each time.
8	Starter handle	1	
9	Rope	1	1,300 mm
10	Starter case	1	
			Reverse the removal steps for installation.



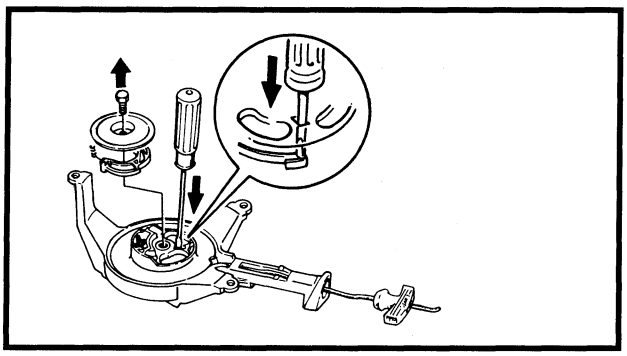
SERVICE POINTS

Sheave drum removal

1. Turn:
   •Sheave drum
   Turn the sheave drum clockwise until the spiral spring is free.

NOTE:

•Turn the sheave drum so that the cutaway on the outer surface of the sheave drum faces toward the starter handle.
•Pass the starter rope through the cut.



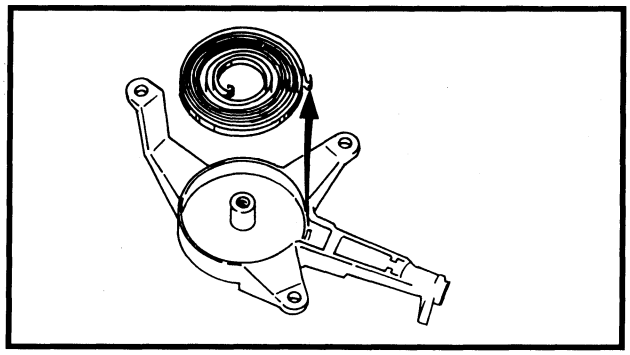
2. Remove:
   •Sheave drum

⚠ WARNING

When removing the sheave drum, be sure to turn the sheave drum upside down to prevent the spiral spring from popping up at you.

NOTE:

Insert a standard screwdriver into the hole in the sheave drum, and remove the spiral spring from the sheave drum by pushing the spring.



Spiral spring removal

1. Remove:
   •Spiral spring

⚠ WARNING

Be careful so that the spiral spring does not pop out when removing it. Remove it by allowing it out one turn of the winding each time.

Drive plate inspection

1. Inspect:
   •Drive plate
   Crack/Damage → Replace.

Drive pawl and spring inspection

1. Inspect:
   •Drive pawl
   Crack/Wear/Damage → Replace.
   •Drive pawl spring
   Broken/Bent/Damage → Replace.

Sheave drum inspection

1. Inspect:
   •Sheave drum
   Crack/Damage → Replace.

Spiral spring inspection

1. Inspect:
   •Spiral spring
   Broken/Bent/Damage → Replace.

Starter rope inspection

1. Inspect:
   - Starter rope
     Fray/Wear/Damage → Replace.

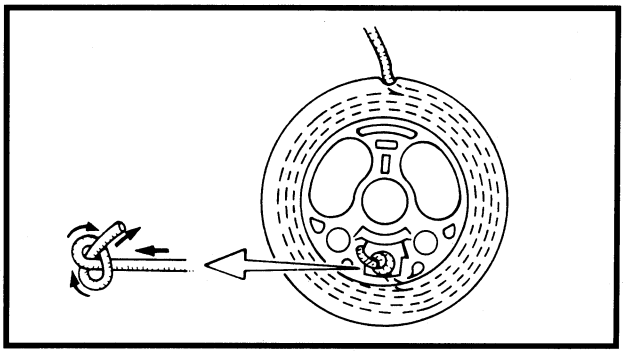
NOTE:

When replacing the rope, cut it to the specified length and burn the rope end to prevent the end from being frayed.

Starter rope length:
1,300 mm (51.2 in)

Starter rope installation

1. Install:
   - Starter rope

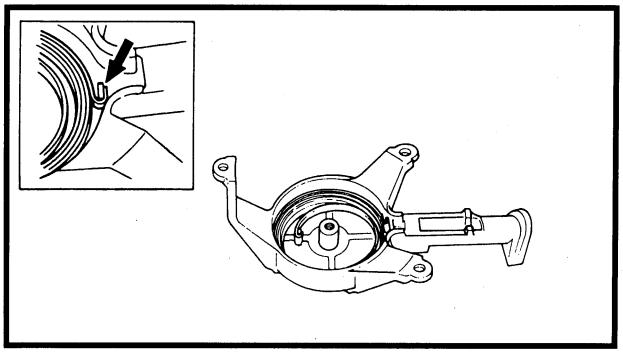


NOTE:

- Insert the rope through the rope holes and knot the end.
- Wind the rope 3-1/2 turns around the sheave drum.
- Place the rope at the cutaway.

Sheave drum installation

1. Install:
   - Sheave drum
   - Spiral spring

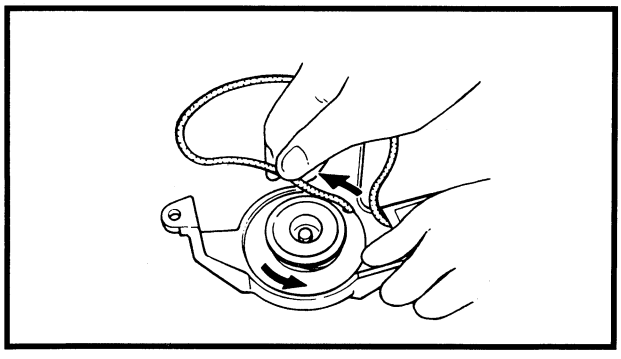


NOTE:

Position the inner end of the spiral spring on the retainer post of the sheave drum.

Spiral spring setting

1. Set:
   - Spiral spring



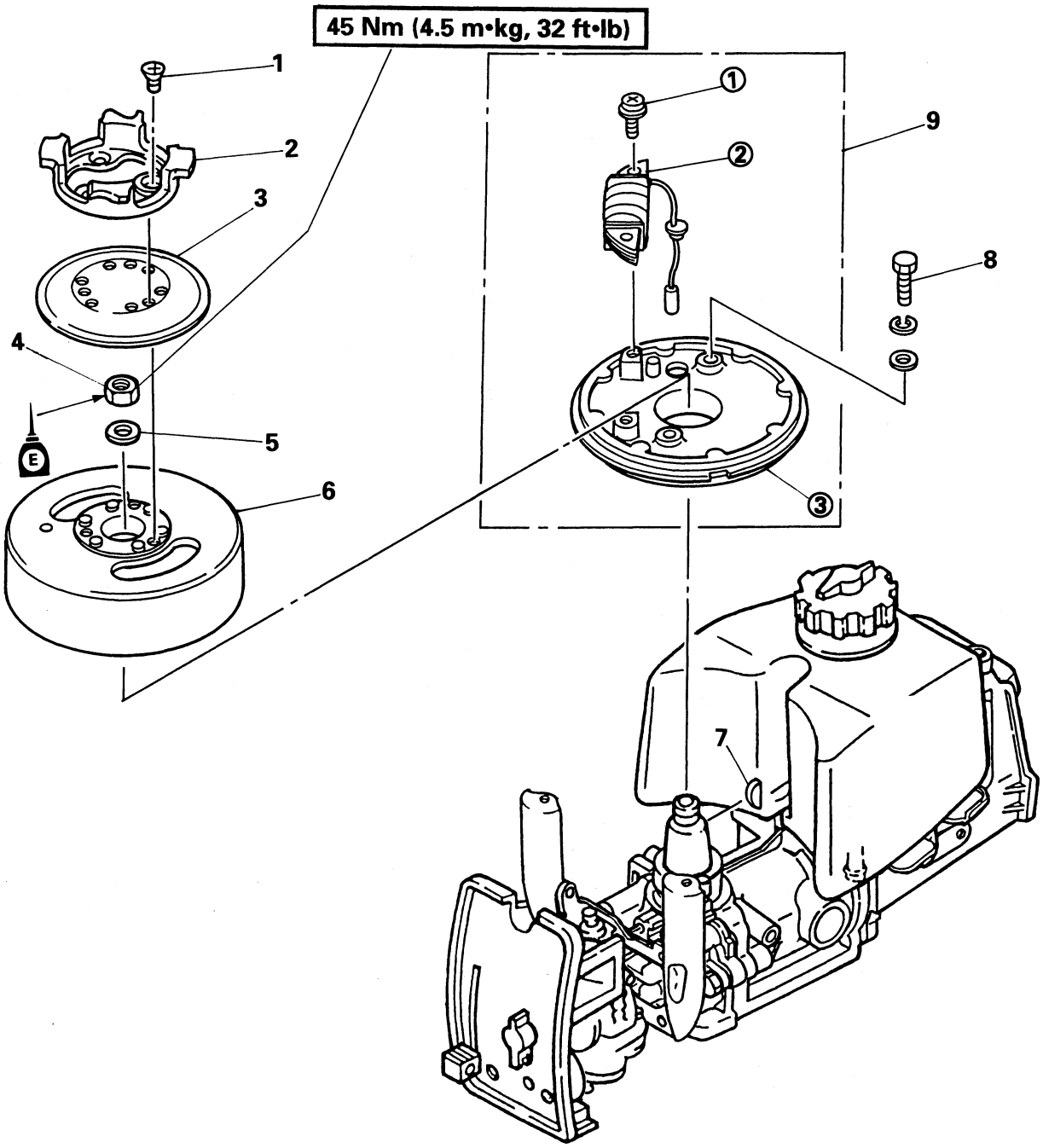
NOTE:

Wind up the spring 3 turns counterclockwise with the starter rope.

Recoil starter checking

1. Check:
   - Starter operation
     Unsmooth operation → Repair.

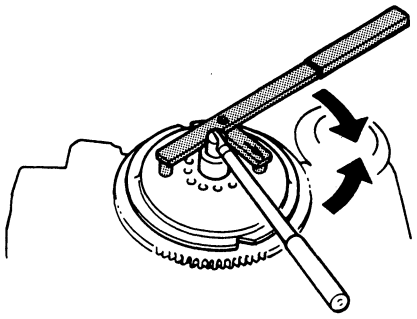
FLYWHEEL MAGNETO AND MAGNETO BASE
EXPLODED DIAGRAM



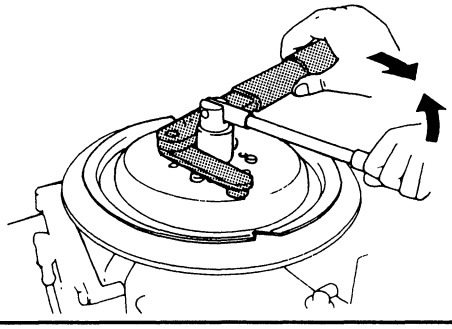
REMOVAL AND INSTALLATION CHART

Step	Procedure/Part name	Q'ty	Service points
	FLYWHEEL MAGNETO AND MAGNETO BASE REMOVAL		Follow the left "Step" for removal.
	Recoil starter assembly		Refer to "FUEL TANK AND FUEL COCK" section in chapter 4.
1	Screw	3	6 x 12 mm
2	Starter pulley	1	
3	Hole cover	1	
4	Flywheel nut	1	
5	Washer	1	
6	Flywheel magneto	1	
7	Woodruff key	1	
8	Bolt	2	
9	Base assembly	1	
	MAGNETO BASE DISASSEMBLY		
①	Screw	2	5 x 20 mm
②	Charge coil	1	
③	Base plate	1	
			Reverse the removal steps for installation.

A



B



SERVICE POINTS

Flywheel magneto removal

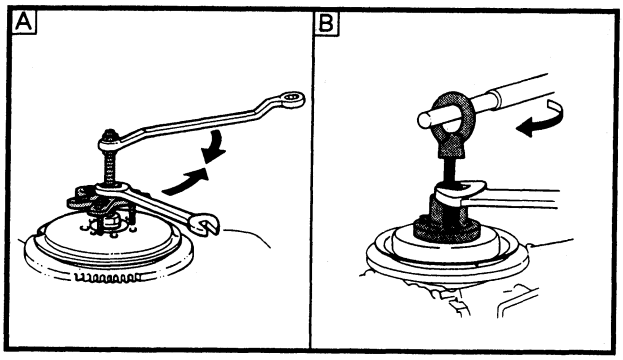
1. Remove:
   - Flywheel nut

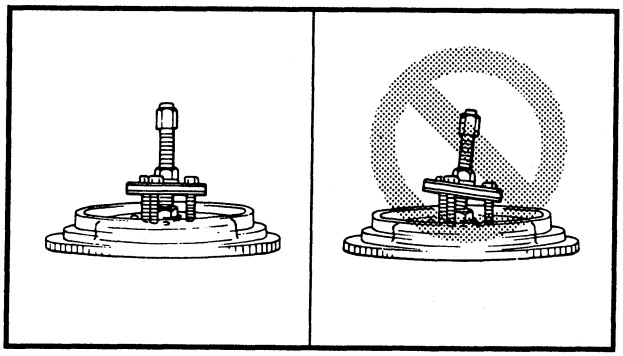
Flywheel holder:
YB-06139 / 90890-06522

A For USA and Canada
B Except for USA and Canada

CAUTION:

The major load should be carried in the direction of the arrows. If not, the holder may easily slip off.





2. Remove:
   •Flywheel magneto

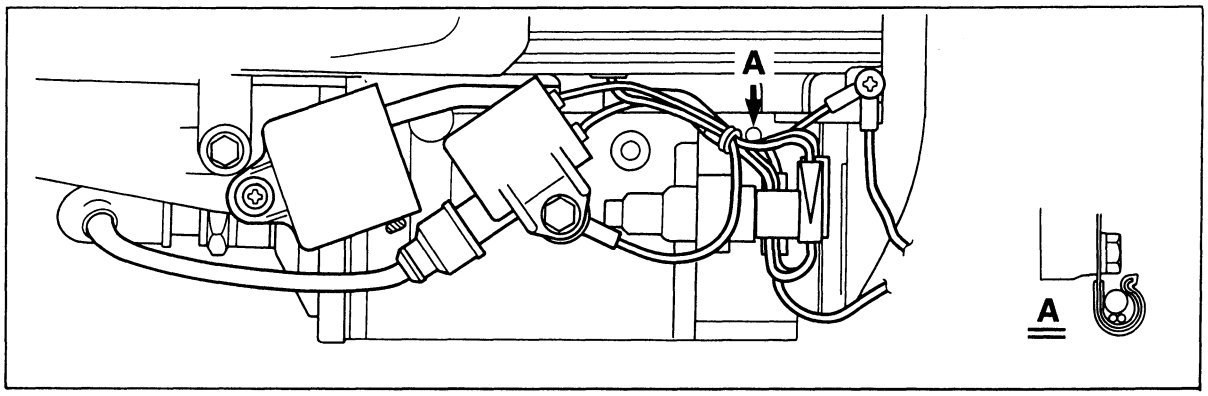
	Flywheel puller: **YB-06117 / 90890-06521**

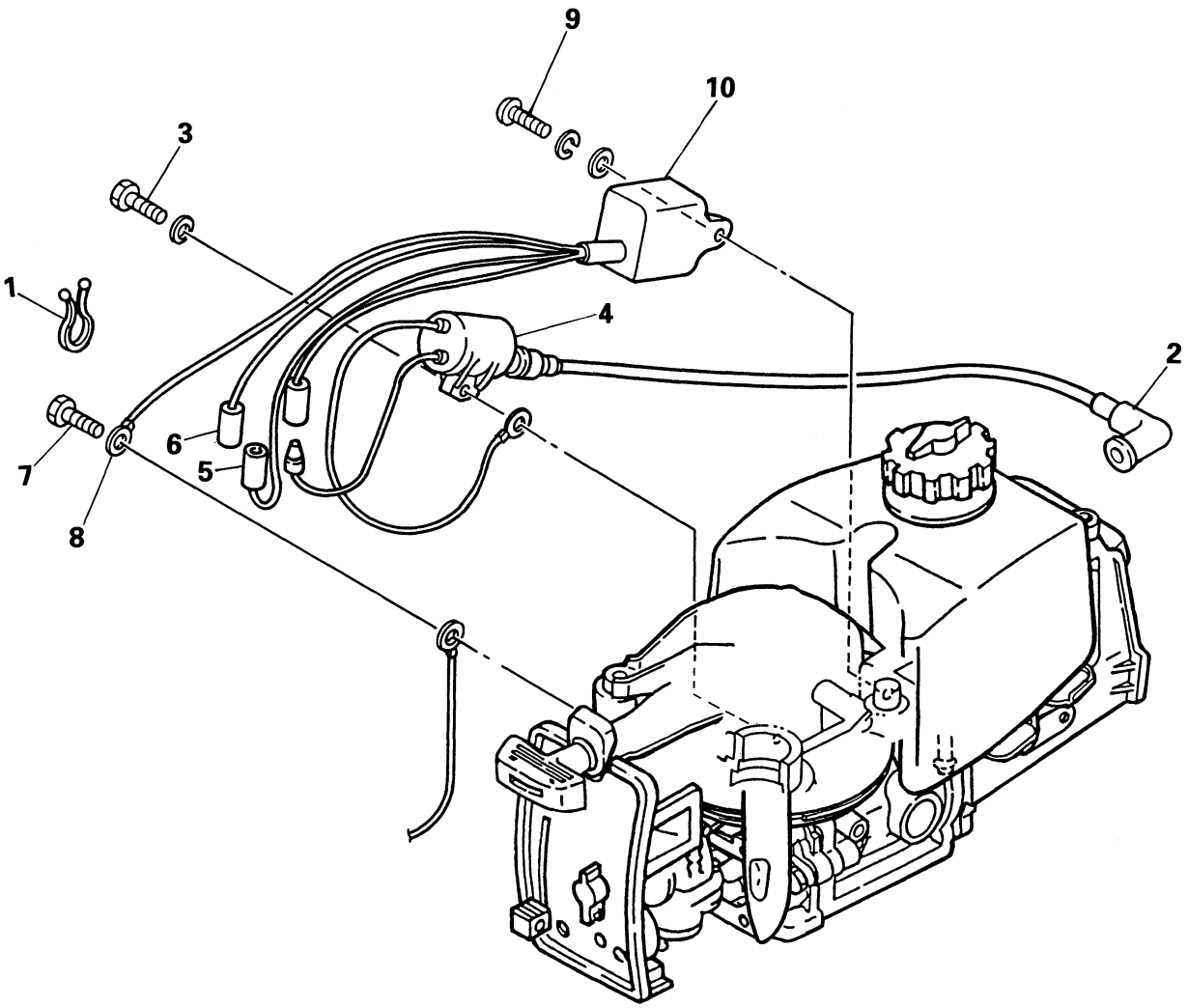
A For USA and Canada
B Except for USA and Canada

CAUTION:

To prevent damage to the engine or tools, screw in the flywheel magneto- puller set-bolts evenly and completely so that the puller plate is parallel to the flywheel.

ELECTRICAL UNIT
EXPLODED DIAGRAM

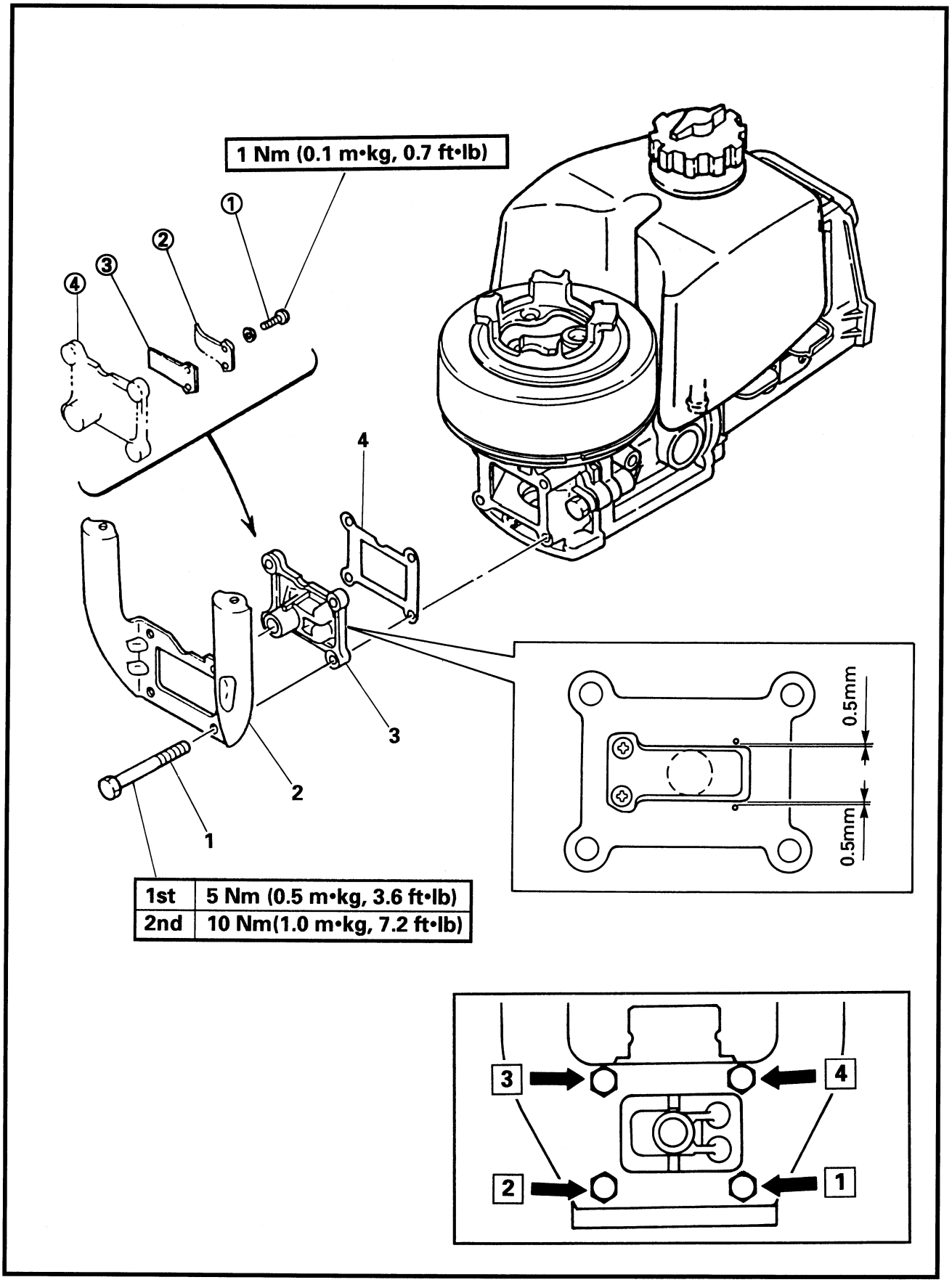




REMOVAL AND INSTALLATION CHART

Step	Procedure/Part name	Q'ty	Service points
	ELECTRICAL UNIT REMOVAL		Follow the left "Step" for removal.
	Apron		Refer to "FUEL TANK AND FUEL COCK" section in chapter 4.
1	Clamp	1	Pink and black leads
2	Spark plug cap	1	
3	Bolt (with washer)	1	6 x 20 mm
4	Ignition coil	1	
5	Charge coil lead (brown)	1	
6	Stop switch lead (white)	1	
7	Screw	1	5 x 8 mm
8	Ground lead (black)	1	
9	Bolt (with washer)	1	
10	CDI unit	1	
			Reverse the removal steps for installation.

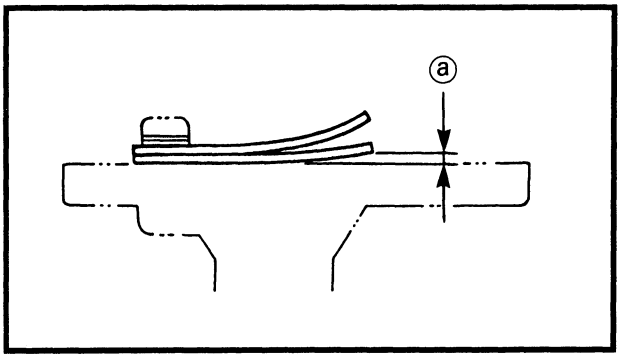
REED VALVE
EXPLODED DIAGRAM

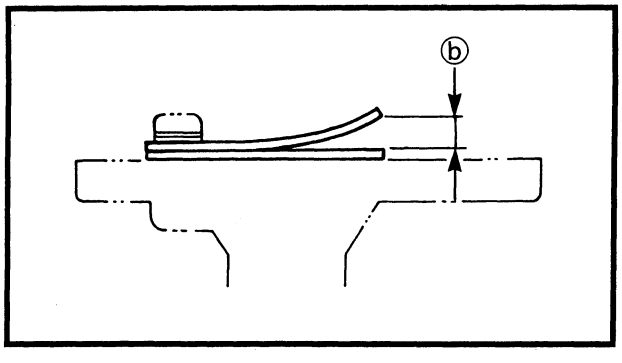


1st	5 Nm (0.5 m•kg, 3.6 ft•lb)
2nd	10 Nm(1.0 m•kg, 7.2 ft•lb)

REMOVAL AND INSTALLATION CHART

Step	Procedure/Part name	Q'ty	Service points
	REED VALVE REMOVAL		Follow the left "Step" for removal.
	Recoil starter assembly		Refer to "FUEL TANK AND FUEL COCK" section in chapter 4.
	Carburetor assembly		Refer to "CARBURETOR REMOVAL" section in chapter 4.
1	Bolt	4	**NOTE:** Tighten the bolts in sequence and in two steps of torque.
2	Stay	1	
3	Reed valve assembly	1	
4	Reed valve gasket	1	
	REED VALVE DISASSEMBLY		
①	Screw (with washer)	2	
②	Valve stopper	1	
③	Reed valve	1	
④	Reed valve body	1	
			Reverse the removal steps for installation.





SERVICE POINTS

Reed valve inspection

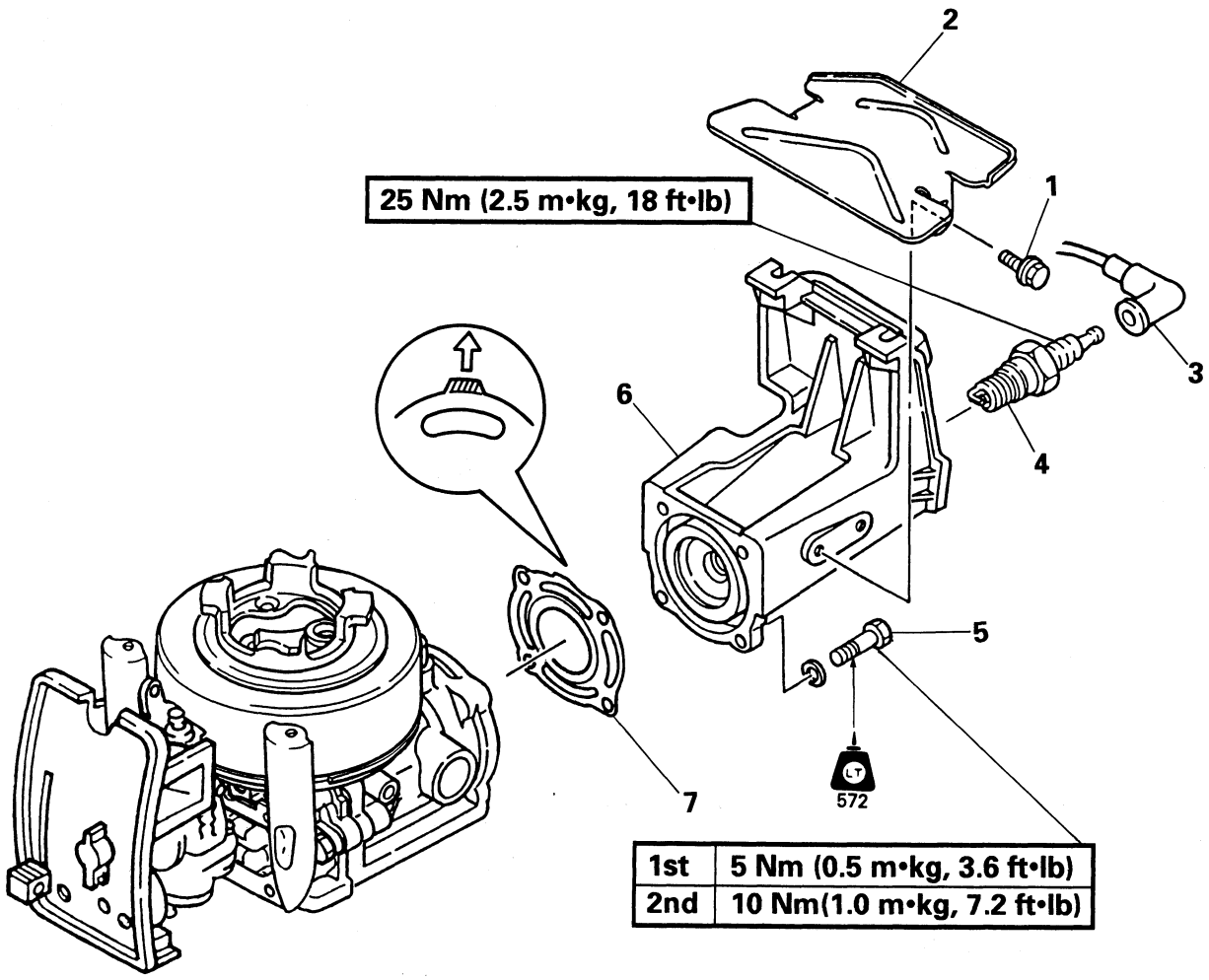
1. Inspect:
   - •Reed valve
     Crack/Damage → Replace.
2. Measure:
   - •Valve warpage ⓐ
     Out of specification → Replace.

Valve warpage limit:
0.3 mm (0.01 in)

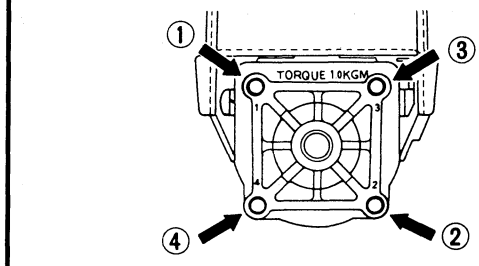
3. Measure:
   - •Valve stopper height ⓑ
     Out of specification → Replace.

Valve stopper height:
6.0 ± 0.2 mm (0.24 ± 0.01 in)

CYLINDER HEAD
EXPLODED DIAGRAM



1st	5 Nm (0.5 m•kg, 3.6 ft•lb)
2nd	10 Nm(1.0 m•kg, 7.2 ft•lb)



REMOVAL AND INSTALLATION CHART

Step	Procedure/Part name	Q'ty	Service points
	CYLINDER HEAD REMOVAL		Follow the left "Step" for removal.
	Fuel tank		Refer to "FUEL TANK AND FUEL COCK" section in chapter 4.
1	Bolt (with washer)	2	6 x 10 mm
2	Fuel tank protector	1	
3	Spark plug cap	1	
4	Spark plug	1	
5	Bolt (with washer)	4	6 x 25 mm
6	Cylinder head	1	**NOTE:** Tighten the bolts in sequence and in two steps of torque.
7	Cylinder head gasket	1	
			Reverse the removal steps for installation.

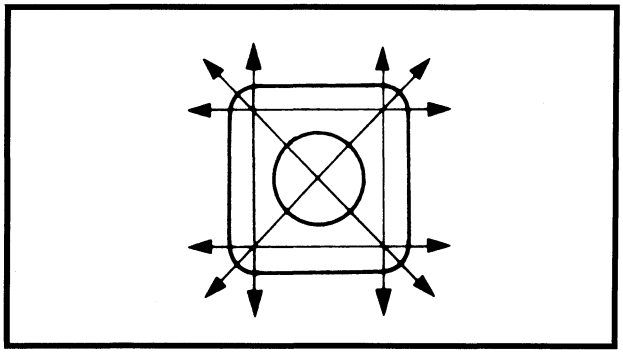
SERVICE POINTS

Cylinder head inspection

1. Inspect:
   - •Water jacket
     Material deposit/Corrosion → Clean.
   - •Cylinder inner surface
     Score marks → Clean.
     Use #600 ~ 800 grit wet sandpaper.

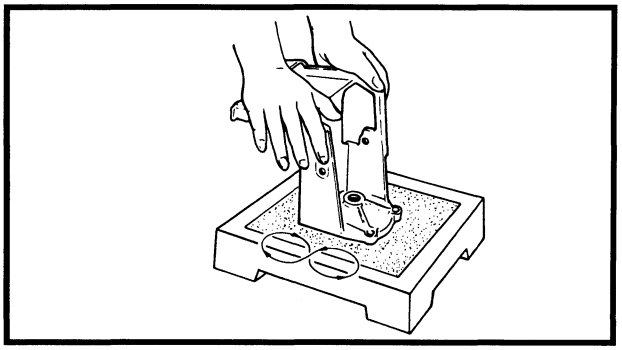
CAUTION:

Do not scratch the mating surfaces of the cylinder head and cylinder body.



2. Measure:
   - •Cylinder head warpage
     Use a straightedge and feeler gauge.
     Out of specification → Rebore or replace.

Warpage limit:
0.1 mm (0.004 in)



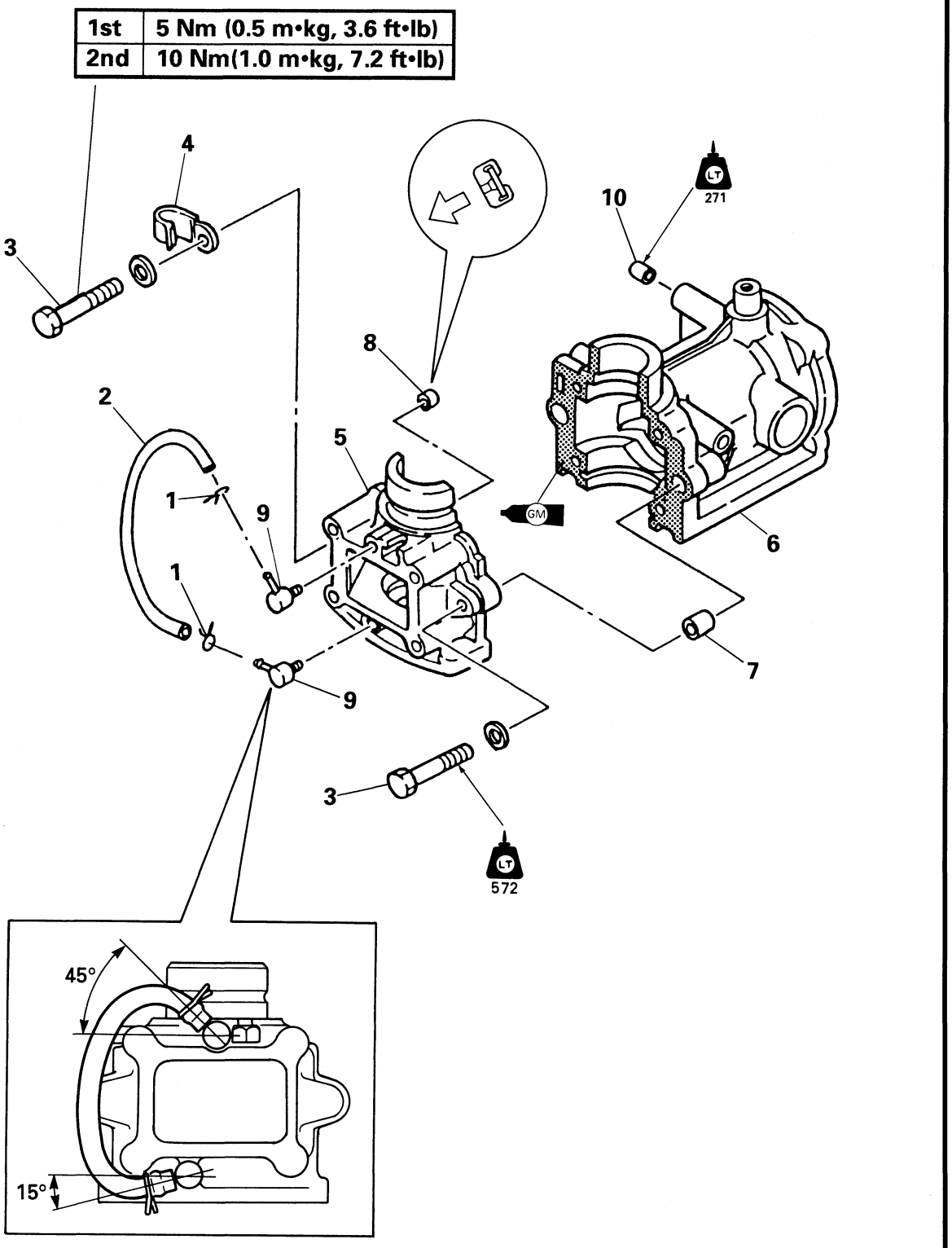
Resurfacing steps:

- •Place a 400 ~ 600 grit wet sandpaper on the surface plate.
- •Resurface the head using a figure-eight sanding pattern.

NOTE:

Rotate the head several times to avoid removing too much material from one side.

CRANKCASE AND CYLINDER BODY
EXPLODED DIAGRAM



REMOVAL AND INSTALLATION CHART

Step	Procedure/Part name	Q'ty	Service points
	CRANKCASE AND CYLINDER BODY REMOVAL		Follow the left "Step" for removal.
	Power unit		Refer to "POWER UNIT REMOVAL" .
	Magneto base assembly		Refer to "FLYWHEEL MAGNETO AND MAGNETO BASE" .
	Reed valve		Refer to "REED VALVE" .
	Cylinder head		Refer to "CYLINDER HEAD" .
1	Clip	2	
2	Drain less hose	1	
3	Bolt (with washer)	2	6 x 40 mm
4	Clamp	1	
5	Crankcase	1	
6	Cylinder body	1	**NOTE:** Film-coat the crankcase mating surface with Gasket Maker or equivalent.
7	Dowel pin	2	
8	Check valve	1	
9	Hose joint	2	
10	Taper plug	1	
			Reverse the removal steps for installation.

SERVICE POINTS

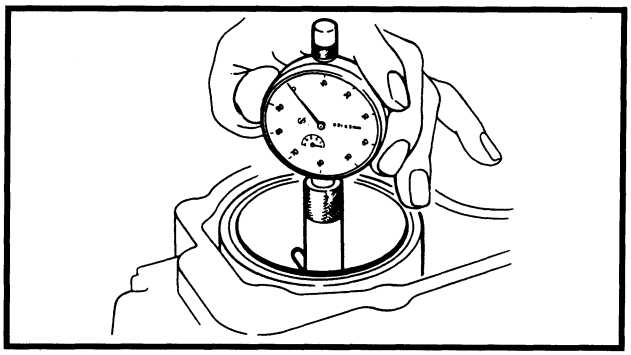
Cylinder body inspection

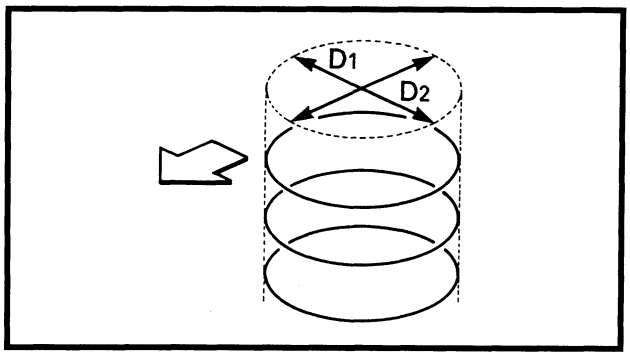
1. Inspect:
   - •Water jacket
     Material deposit/Corrosion → Clean.
   - •Cylinder inner surface
     Score marks → Clean.
     Use #600 ~ 800 grit wet sandpaper.

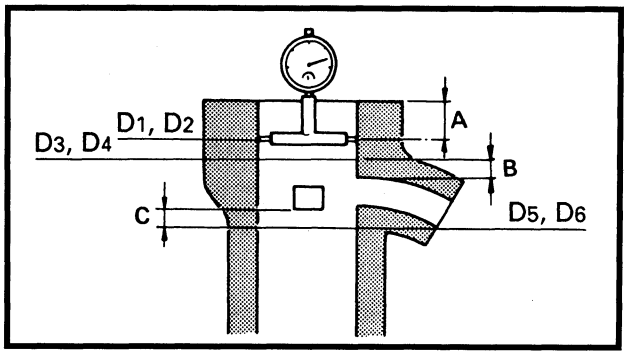
CAUTION:

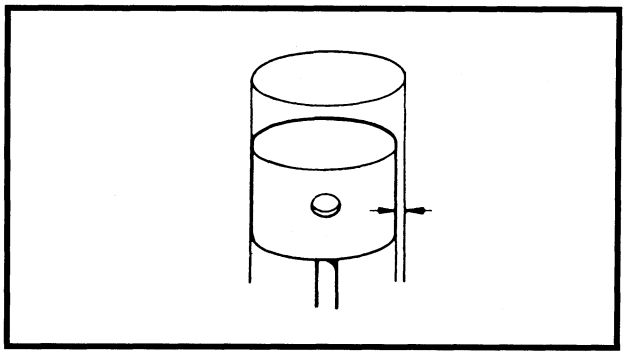
Do not scratch the fitting surfaces of the crankcase and cylinder body.

2. Inspect:
   - •Exhaust wall
     Crack/Damage → Replace.
     Carbon deposit → Clean.
     Use a round scraper.









3. Measure:
   •Cylinder bore "D"
   Use cylinder gauge.
   Out of specification → Rebore or replace.

NOTE:

Measure the cylinder bore in parallel. Then, find the average of the measurement.

Cylinder bore:
2B 39.00 ~ 39.02 mm (1.535 ~ 1.536 in)
2C 42.00 ~ 42.02 mm (1.654 ~ 1.654 in)
Wear limit:
2B 39.10 mm (1.54 in)
2C 42.10 mm (1.66 in)
Taper limit "T":
0.08 mm (0.003 in)
Out of round limit :
0.05 mm (0.002 in)

D = Maximum Dia. (D1 ~ D6)
T = (Maximum D1 or D2) - (minimum D5 or D6)

A: 10 mm (0.4 in) below the cylinder top
B: 5 mm (0.2 in) above the exhaust port
C: 5 mm (0.2 in) below the scavenging port

Piston to cylinder clearance

1. Calculate:
   •Piston clearance
   Out of specification → Replace piston and piston ring and/or cylinder.

Piston clearance	=	Cylinder bore	–	Piston diameter

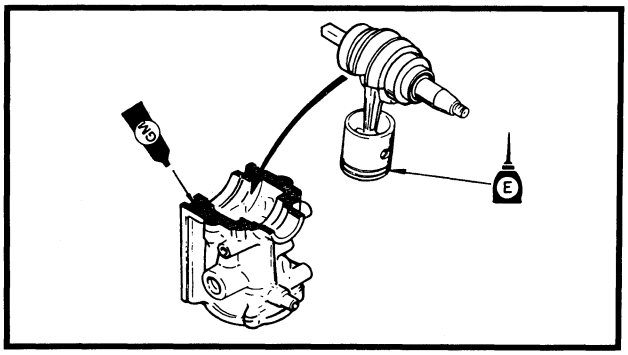
Piston clearance:
0.030 ~ 0.035 mm (0.0012 ~ 0.0014 in)
Limit:
0.085 mm (0.0033 in)

Cylinder body and crankcase installation

1. Install:
   - Cylinder body
   - Crankshaft and piston

NOTE:

- Align the piston ring end gaps with the respective locating pins.
- Fit the bearing locating pins in the cylinder body.



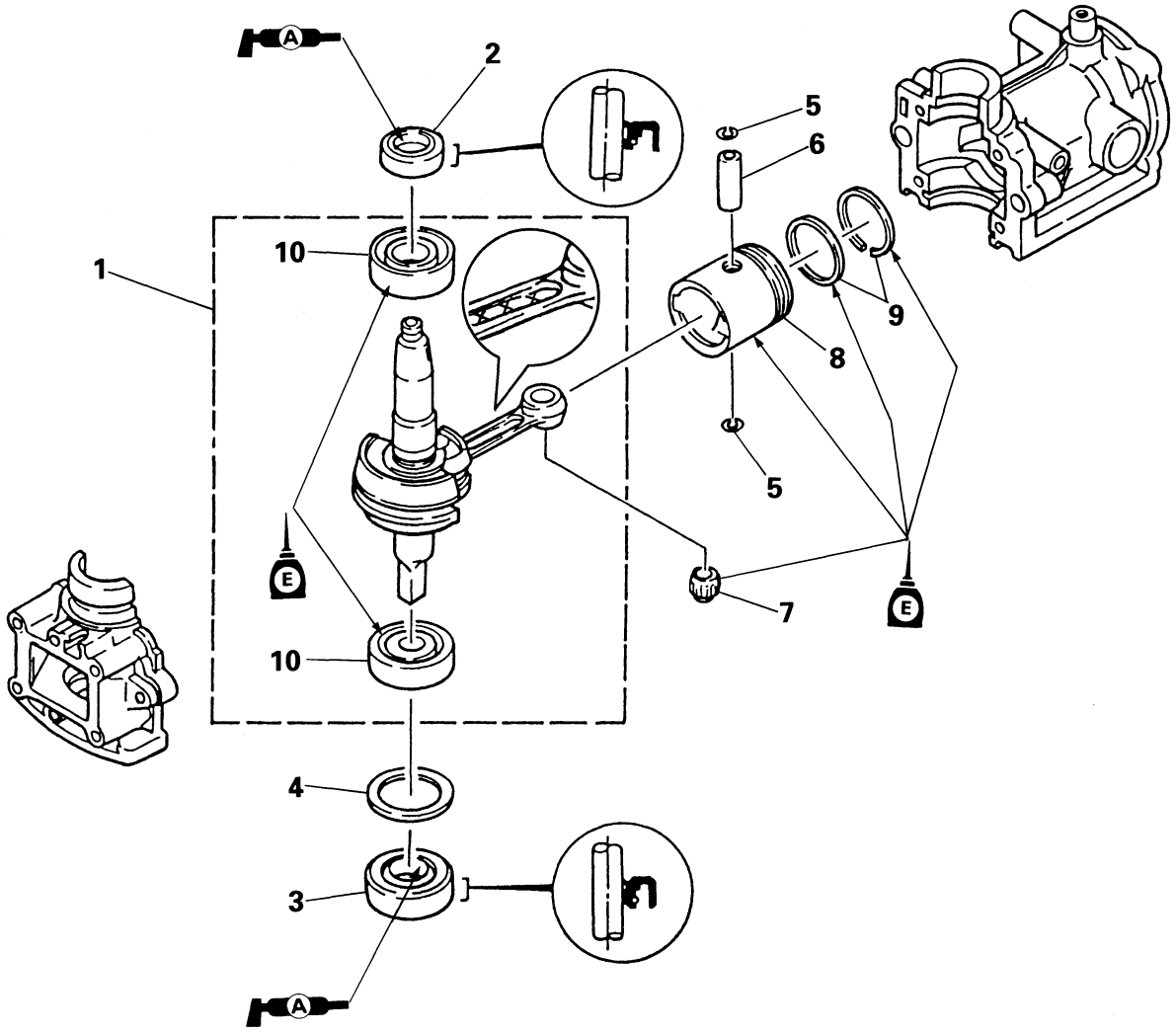
2. Apply:
   - Gasket maker

   Onto the mating surfaces of the crankcase and cylinder body.

NOTE:

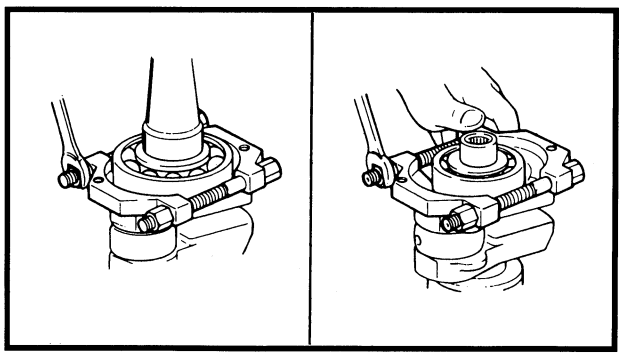
- Clean the mating surfaces of the crankcase and cylinder body before applying the Gasket maker.
- Gasket maker should be so applied that it does not overflow the mating surface.

CRANKSHAFT AND PISTON
EXPLODED DIAGRAM



REMOVAL AND INSTALLATION CHART

Step	Procedure/Part name	Q'ty	Service points
	CRANKSHAFT AND PISTON REMOVAL		Follow the left "Step" for removal.
	Crankcase		Refer to "CRANKCASE AND CYLINDER BODY".
1	Crankshaft assembly	1	**NOTE:** Remove the crankshaft by lightly tapping it with a plastic hammer.
2	Oil seal	1	
3	Oil seal	1	
4	Plane washer	1	
5	Piston pin clip	2	**CAUTION:** **Always use the new clip.**
6	Piston pin	1	
7	Small end bearing	1	
8	Piston	1	**NOTE:** Align the "UP" mark on the piston crown towards the crankshaft tapered end.
9	Piston ring	2	**NOTE:** Remove the piston ring from the piston by opening the ring to the least possible width.
10	Bearing	2	**CAUTION:** **When installing the bearing, the seal-cap side should be installed towards the flywheel side.** Reverse the removal steps for installation.



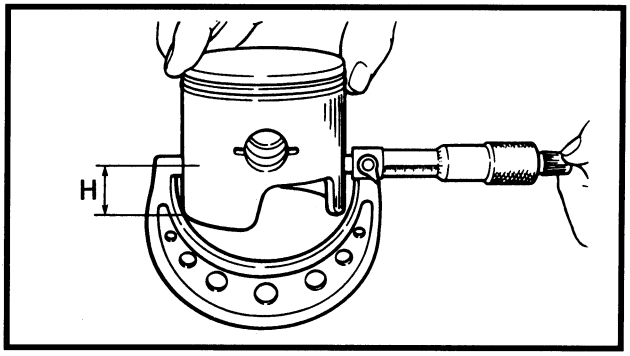
SERVICE POINTS

Bearing removal

1. Remove:
   - Bearing

NOTE:
Hold the bearing with the bearing separator, and forth out the crankshaft with a press.

Bearing separator:
YB-06219 / 90890-06534

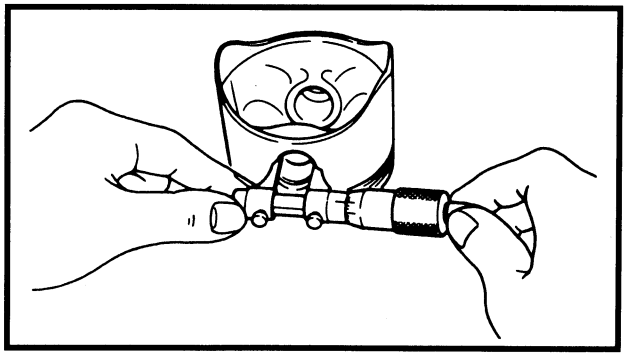


Piston inspection

1. Measure:
   •Piston diameter "D"
   Use a micrometer.
   Out of specification → Replace.

Piston diameter:
2B: 38.967 ~ 38.986 mm
(1.5341 ~ 1.5349 in)
2C: 41.970 ~ 42.000 mm
(1.6524 ~ 1.6535 in)
Measuring point "H":
10 mm (0.39 in)
Oversize piston diameter:
2B 1*: 39.25 mm (1.545 in)*
2 : 39.50 mm (1.555 in)
2C 1: 42.25 mm (1.663 in)
2 : 42.50 mm (1.673 in)

* : Except for U.S.A.

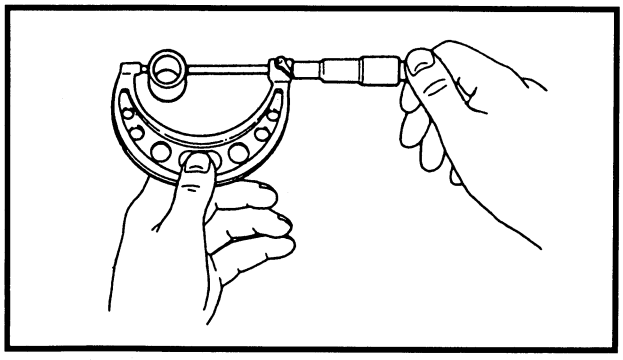


2. Measure:
   •Piston pin boss inside diameter
   Use a micrometer.
   Out of specification → Replace.

Piston pin boss inside diameter:
10.004 ~ 10.015 mm
(0.3939 ~ 0.3943 in)

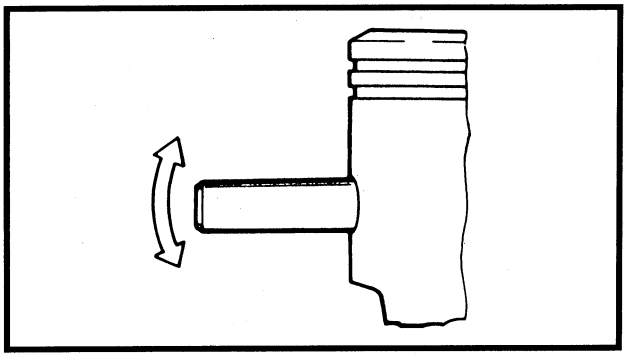
Piston pin and small end bearing inspection

1. Inspect:
   •Piston pin
   •Small end bearing
   Signs of heat discoloration → Replace.
   Scratch/Damage → Replace.

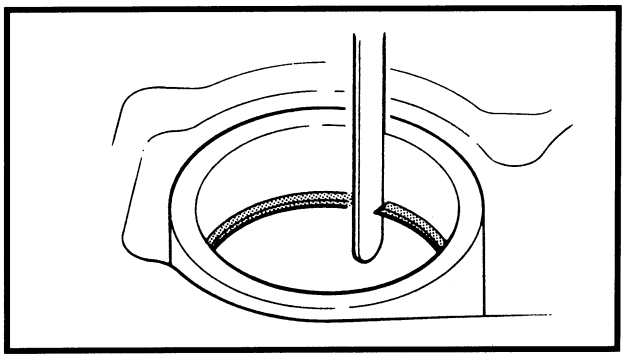


2. Measure:
   •Piston pin diameter
   Use a micrometer.
   Out of specification → Replace.

Piston pin diameter:
9.996 ~ 10.000 mm
(0.3935 ~ 0.3937 in)

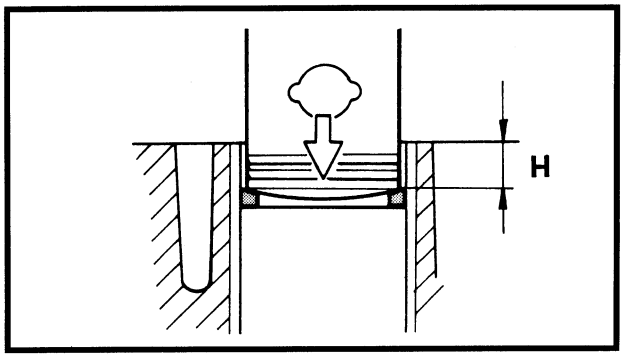


3. Check:
   •Free play (when the piston pin is inserted in the piston.)
   There should be no noticeable for the play.
   Free play exists → Replace the pin and/or piston.



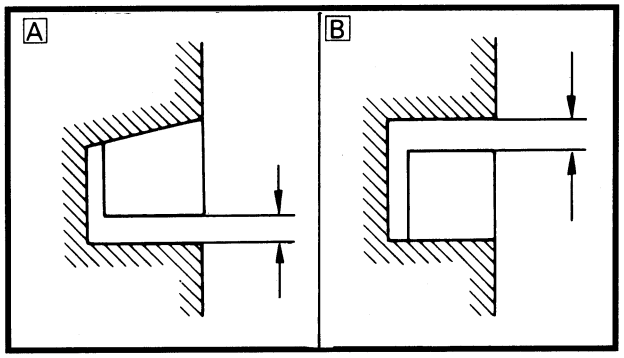
Piston ring inspection

1. Inspect:
   •Piston ring
   Break/Damage → Replace.
2. Measure:
   •End gap
   Use a thickness gauge.
   Out of specification → Replace.



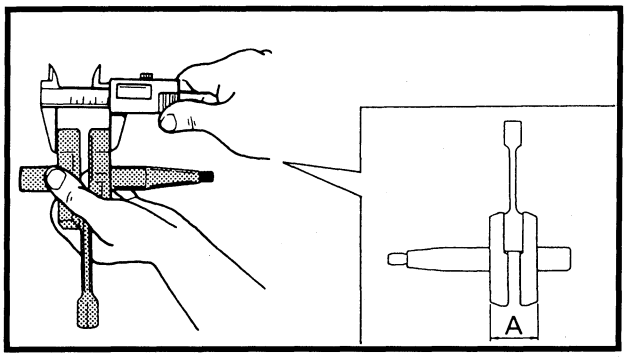
End gap:
Top 0.10 ~ 0.30 mm (0.004 ~ 0.012 in)
2nd 0.10 ~ 0.30 mm) (0.004 ~ 0.012 in)
Measuring point "H": 20 mm (0.8 in)

NOTE:
Install the piston ring into the cylinder. Push the ring with the piston crown.



3. Measure:
   •Side clearance
   Use a thickness gauge.
   Out of specification → Replace piston and/or ring.

Side clearance:
2B Top: 0.03 ~ 0.07 mm (0.001 ~ 0.003 in)
[B] 2nd: 0.03 ~ 0.07 mm (0.001 ~ 0.003 in)
2C Top: 0.02 ~ 0.06 mm (0.001 ~ 0.002 in)
[A] 2nd: 0.03 ~ 0.07 mm (0.001 ~ 0.003 in)
[B]

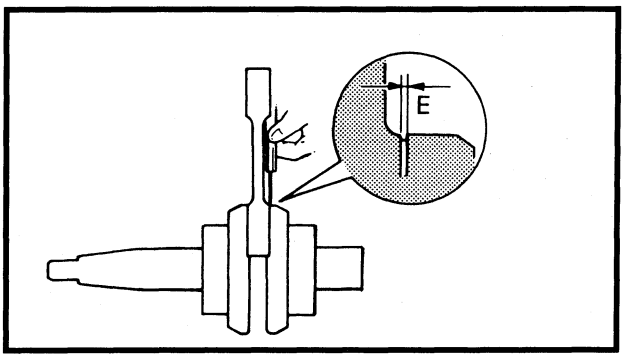


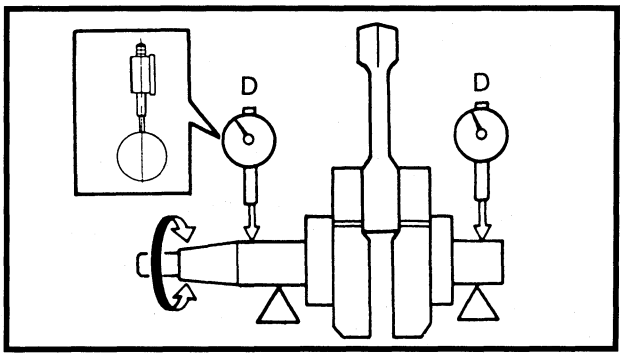
Crankshaft inspection

1. Measure:
   - •Crank width "A"
   - •Big end side clearance "E"

   Out of specification → Replace.

Crank width:
27.90 ~ 27.95 mm
(1.098 ~ 1.100 in)
Big end side clearance:
0.30 ~ 0.60 mm
(0.012 ~ 0.024 in)

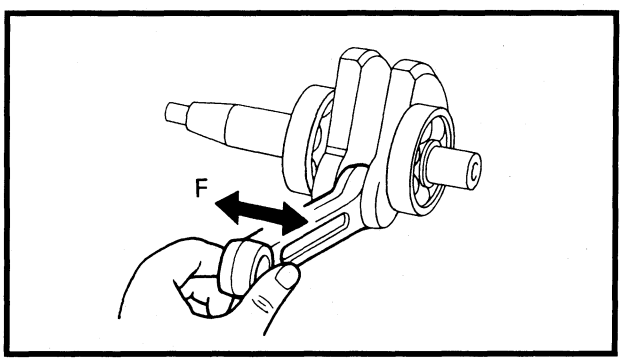




2. Measure:
   - •Runout "D"

   Use a V-blocks and dial gauge.
   Out of specification → Replace.

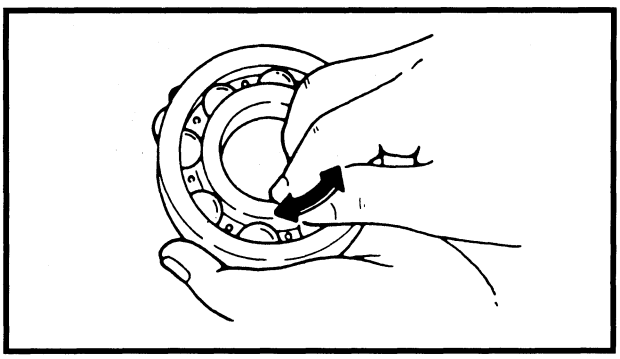
Runout limit:
0.02 mm (0.001 in)



3. Measure:
   - •Small end axial play "F"

   Out of specification → Replace.

Small end axial play limit:
2.0 mm (0.08 in)

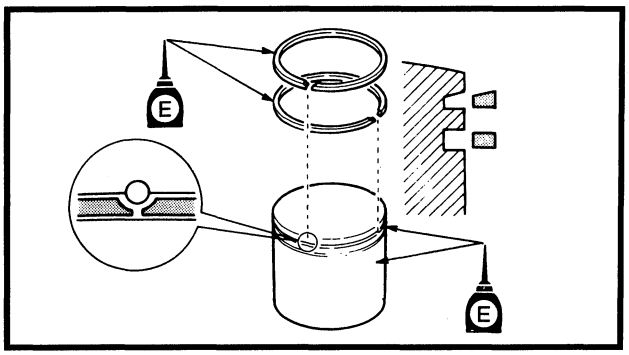


4. Inspect:
   - •Crankshaft bearing

   Pitting/ Rumbling → Replace.

CAUTION:

Do not spin bearing with air blower; this can damage the bearing.



Piston and piston ring installation

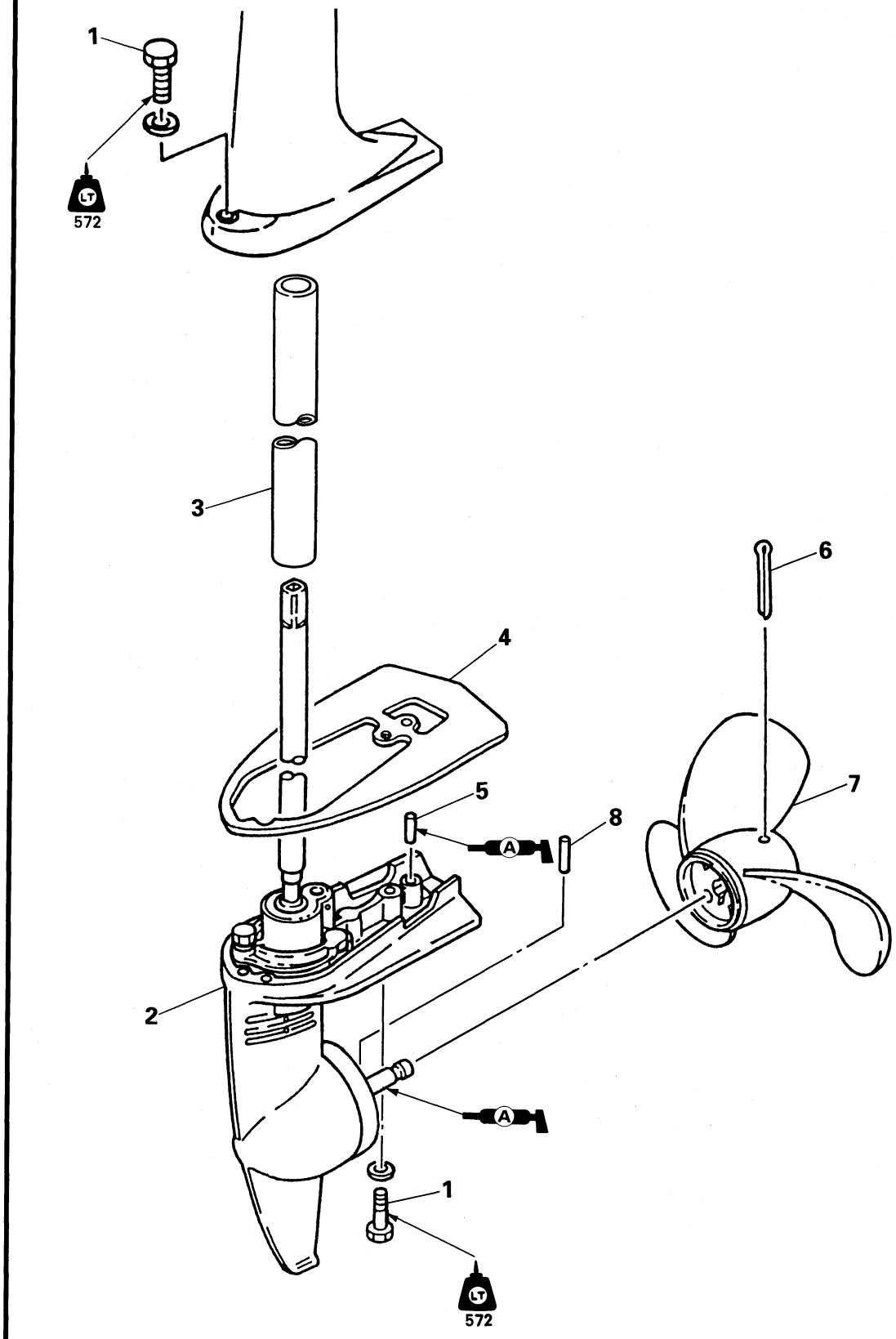
1. Install:
   - Piston ring (2nd)
   - Piston ring (top)

CAUTION:

- **Align the each ring end gap with their locating pins.**
- **After mating the rings, check that they move smoothly.**

CHAPTER 6
LOWER UNIT

LOWER UNIT AND PROPELLER
EXPLODED DIAGRAM



REMOVAL AND INSTALLATION CHART

Step	Procedure/Part name	Q'ty	Service points
	LOWER UNIT REMOVAL		Follow the left "Step" for removal.
1	Bolt (with washer)	2	6 x 30mm
2	Lower unit	1	
3	Pipe	1	
4	Plate	1	
5	Dowel pin	2	
	PROPELLER REMOVAL		
6	Cotter pin	1	
7	Propeller	1	
8	Straight pin	1	
			Reverse the removal steps for installation.

SERVICE POINTS

Pipe inspection

1. Inspect:
   - •Pipe
     Wear/Crack/Damage → Replace.

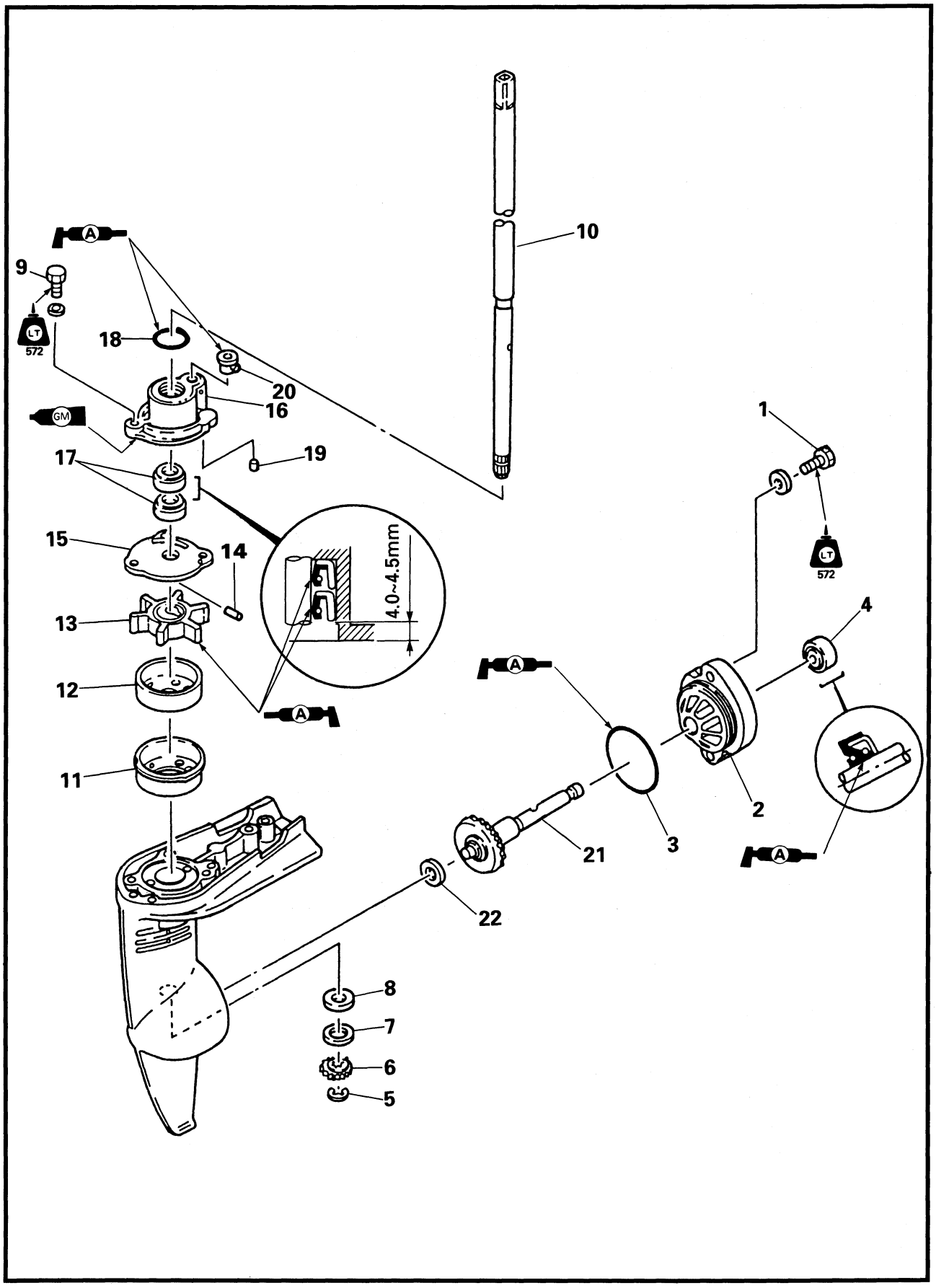
Cotter pin and shear pin inspection

1. Inspect:
   - •Cotter pin
   - •Shear pin
     Wear/Damage → Replace.

Propeller inspection

1. Inspect:
   - •Blade
     Wear/Crack/Damage → Replace.

PINION GEAR, WATER PUMP AND FORWARD GEAR
EXPLODED DIAGRAM



REMOVAL AND INSTALLATION CHART

Step	Procedure/Part name	Q'ty	Service points
	PINION GEAR, WATER PUMP AND FORWARD GEAR REMOVAL		Follow the left "Step" for removal. Step
	Gear oil		Refer to "LOWER UNIT" section in chapter 3.
	Lower unit		Refer to "LOWER UNIT AND PROPELLER".
	Propeller		Refer to "LOWER UNIT AND PROPELLER".
1	Bolt (with washer)	2	6 x 14mm
2	Lower case cap	1	
3	O-ring	1	
4	Oil seal	1	
5	Circlip	1	
6	Pinion gear	1	
7	Plane washer	1	
8	Pinion gear shim	1	
9	Bolt (with washer)	2	5 x 16mm
10	Drive shaft	1	
11	Oil seal protector	1	
12	Insert cartridge	1	**NOTE:** When installing the water pump housing, align the hole in it with the projection in the insert cartridge.
13	Impeller	1	**NOTE:** When installing the impeller, turn the drive shaft clockwise.
14	Dowel pin	1	
15	Cartridge outer plate	1	
16	Water pump housing cover	1	
17	Oil seal	2	
18	O-ring	1	
19	Dowel pin	2	
20	Water seal	1	
21	Forward gear	1	
22	Forward gear shim	1	
			Reverse the removal steps for installation.

SERVICE POINTS

Lower case cap inspection

1. Clean:
   - Lower case cap

   Use a soft brush and solvent.
2. Inspect:
   - Lower case cap

   Crack/Damage → Replace.

Pinion gear inspection

1. Inspect:
   - Teeth

   Wear/Damage → Replace.

Drive shaft inspection

1. Inspect:
   - Drive shaft

   Wear/Damage → Replace.

Insert cartridge and impeller inspection

1. Inspect:
   - Insert cartridge
   - Impeller

   Crack/Damage → Replace.

Water pump housing cover inspection

1. Inspect:
   - Water pump housing cover

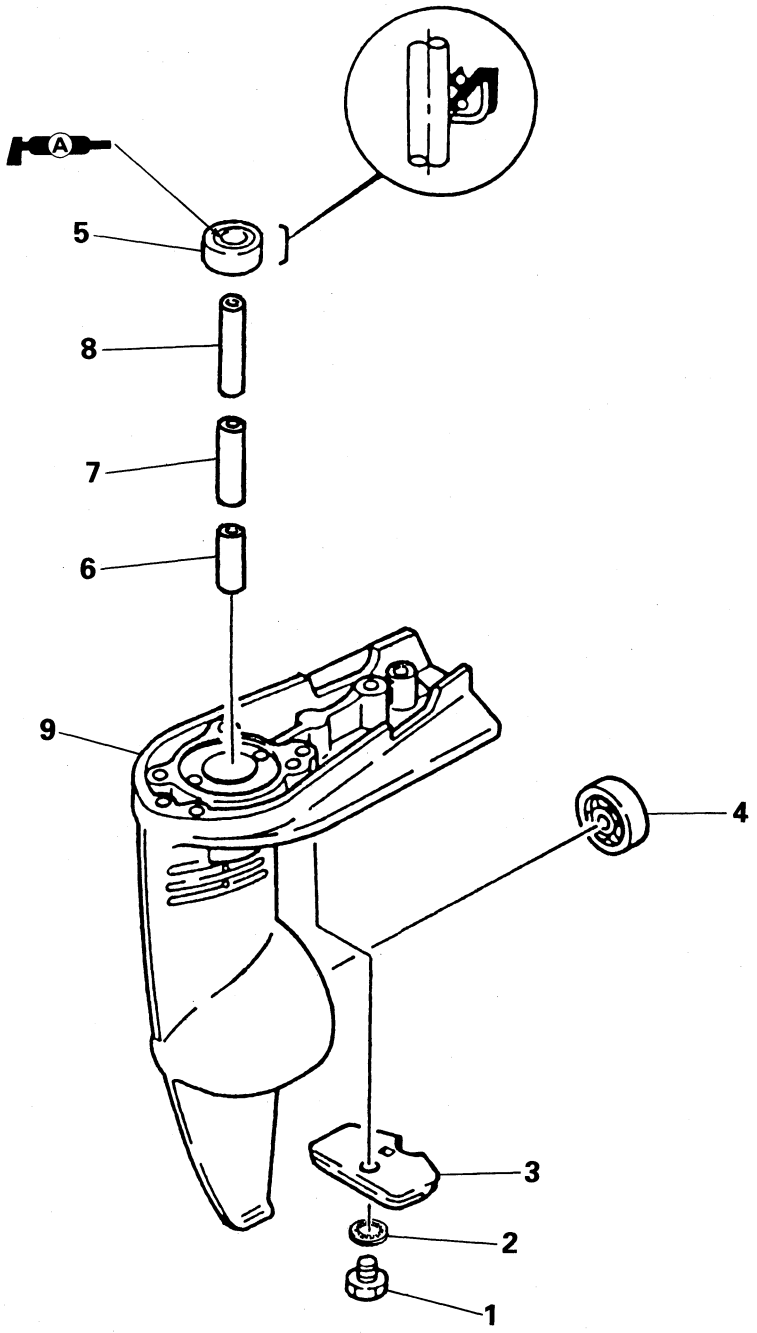
   Crack/Damage → Replace.

Forward gear inspection

1. Inspect:
   - Teeth
   - Shaft

   Wear/Damage → Replace.

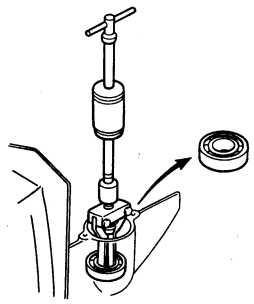
LOWER CASE
EXPLODED DIAGRAM



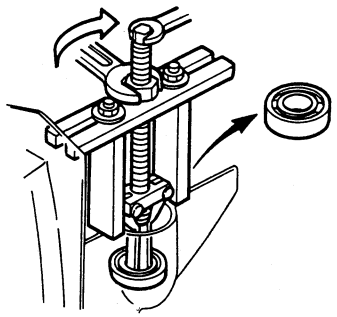
REMOVAL AND INSTALLATION CHART

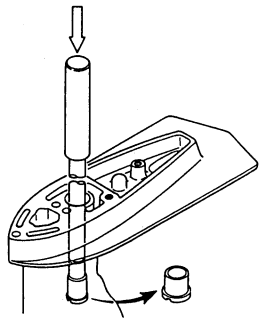
Step	Procedure/Part name	Q'ty	Service points
	LOWER CASE DISASSEMBLY		Follow the left "Step" for removal.
	Lower unit		Refer to "LOWER UNIT AND PROPELLER".
	Forward gear		Refer to "PINION GEAR, WATER PUMP AND FORWARD GEAR".
1	Bolt	1	6 × 12 mm
2	Toothed washer	1	
3	Anode	1	
4	Bearing	1	
5	Oil seal	1	
6	Drive shaft bushing	1	
7	Drive shaft bushing	1	
8	Drive shaft bushing	1	
9	Lower case	1	
			Reverse the removal steps for installation.

A



B





SERVICE POINTS

Forward gear bearing removal

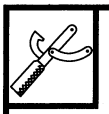
1. Remove:
   - Forward gear bearing

Slide hammer set:
YB-06096
Stopper guide plate:
90890-06501
Bearing outer race puller clow:
90890-06535
Stopper guide stand:
90890-06538

A For USA and CANADA
B Except for USA and CANADA

Drive shaft bushing removal

1. Remove:
   - Drive shaft bushing



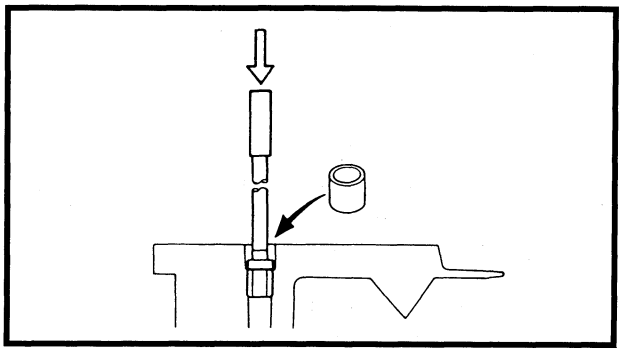
Drive shaft bushing remover:
YB-06027/90890-06651
Driver rod:
YB-06229/90890-06652

Bearing inspection

1. Inspect:
   •Bearing
   Pitting/Rumbling → Replace.

Lower case inspection

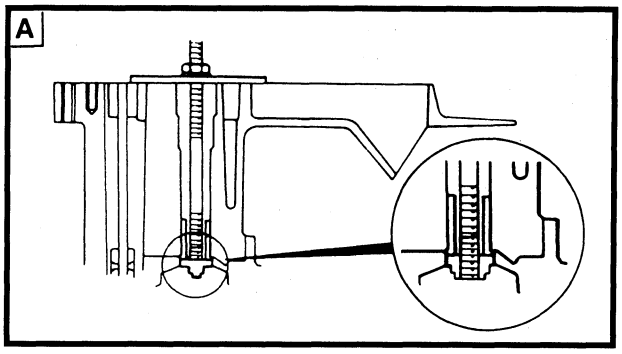
1. Clean:
   •Gear case
   Use a soft brush and solvent.
2. Inspect:
   •Water passage
   Mineral deposits/Corrosion → Clean.
3. Inspect:
   •Lower case
   Crack/Damage → Replace.



Drive shaft bushing installation

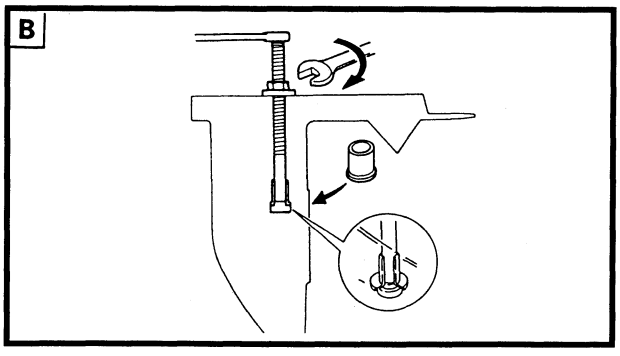
1. Install:
   •Drive shaft bushing

Bearing installer:
YB-06027/90890-06651
Driver rod:
YB-06229/90890-06652



2. Install:
   •Drive shaft bushing

Bushing installer:
YB-06029/90890-06601
Needle bearing installer:
YB-06169
Bushing attachment:
90890-06651

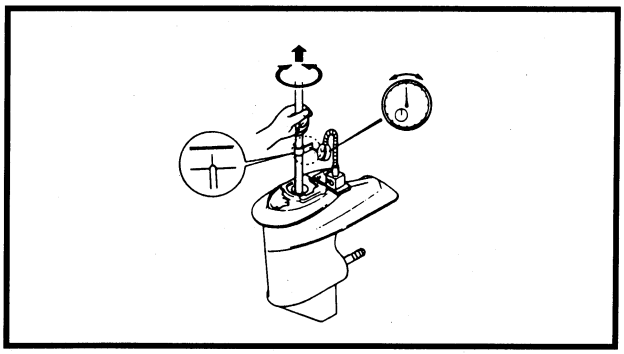


A For USA and CANADA
B Except for USA and CANADA

SHIMMING
BACKLASH MEASUREMENT

NOTE:

Do not install the water pump components when measuring the backlash.



Forward gear backlash

1. Measure:
   - •Forward gear backlash

   Out of specification → Adjust.

Backlash:
0.27~0.99mm

Measuring steps:

- •Attach the backlash indicator on the drive shaft (11 mm in diameter).

Backlash indicator:
YB-06265/90890-06265

- •Attach the dial gauge on the gear case, and make the dial gauge stem contact the mark on the indicator.

Backlash adjusting plate:
YB-07003
Dial gauge:
YU-03097/90890-01252
Magnetic flexible stand:
YU-34481/90890-06705

- •While pulling the drive shaft and pushing the propeller shaft, slowly turn the drive shaft clockwise and counterclockwise; then, measure the backlash when the drive shaft stops in each direction.

2. Adjust:
   •Forward gear shim

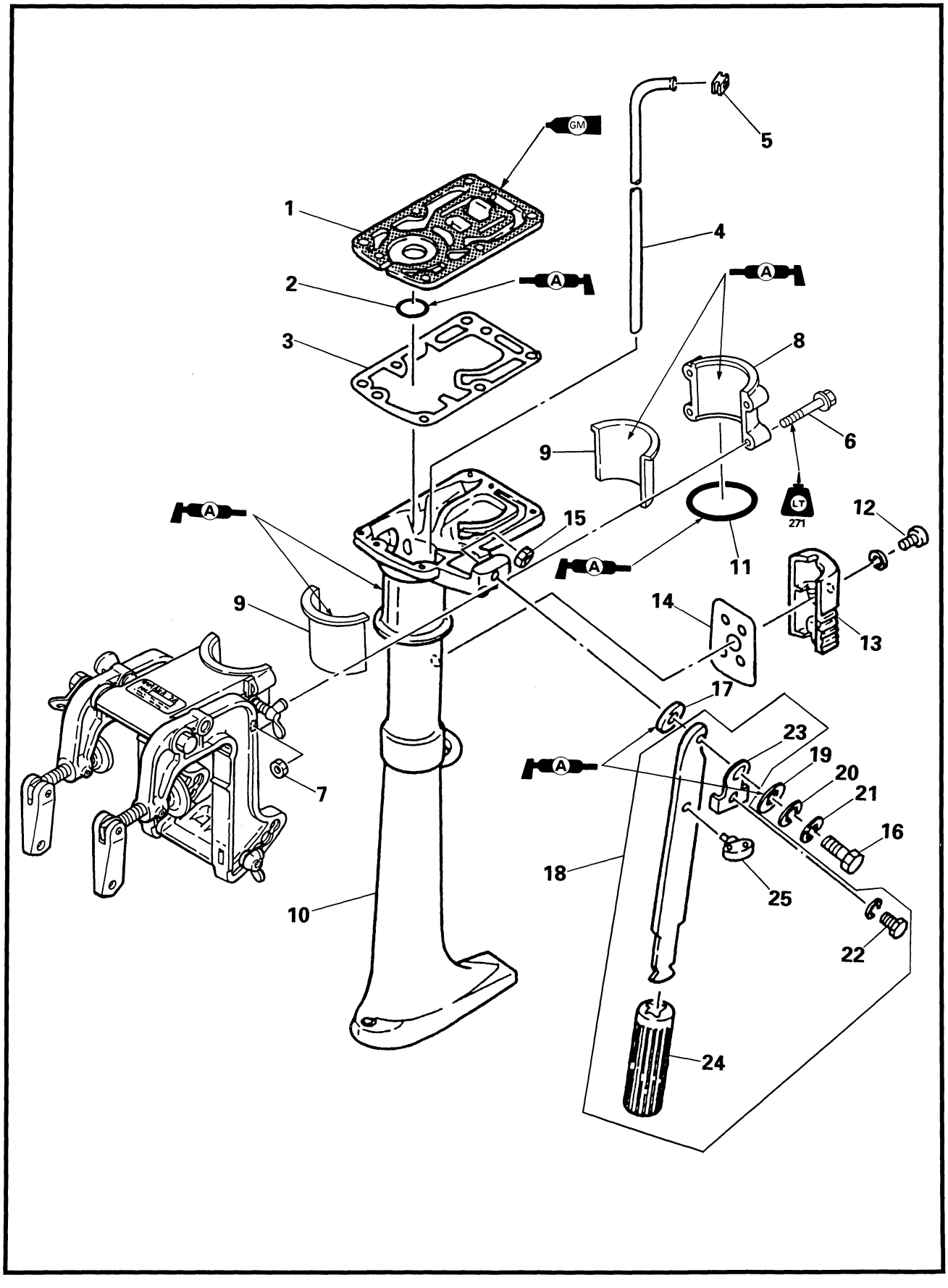
NOTE:

Adjust the shim to be added or removed according to specification.

 Forward gear backlash	Shim thickness
Less than 0.27 mm	To be decreased by (0.63 - measurement) × 0.47
More than 0.99 mm	To be increased by (measurement - 0.63) × 0.47
Available shim thickness: 0.30, 0.40 and 0.50 mm	

CHAPTER 7
BRACKET UNIT

UPPER CASE AND TILLER HANDLE
EXPLODED DIAGRAM



REMOVAL AND INSTALLATION CHART

Step	Procedure/Part name	Q'ty	Service points
	UPPER CASE REMOVAL		Follow the left "Step" for removal.
	Power unit		Refer to "POWER UNIT REMOVAL" section in chapter 5.
	Lower unit		Refer to "LOWER UNIT AND PROPELLER" section in chapter 6.
1	Exhaust guide	1	
2	O-ring	1	
3	Exhaust guide gasket	1	
4	Water tube	1	
5	Water seal	1	
6	Bolt (with washer)	4	
7	Nut	4	
8	Swivel bracket holder	1	
9	Pivot shaft bushing	2	
10	Upper case	1	
11	O-ring	1	
12	Screw (with washer)	1	
13	Upper case cover	1	
14	Upper case cover gasket	1	
	TILLER HANDLE REMOVAL		
15	Nut	1	
16	Bolt	1	
17	Copper washer	1	
18	Tiller handle assembly	1	
19	Copper washer	1	
20	Plane washer	1	
21	Spring washer	1	
22	Bolt (with washer)	1	
23	Plate	1	
24	Handle grip	1	
25	Shear pin holder	1	
			Reverse the removal steps for installation.

SERVICE POINTS

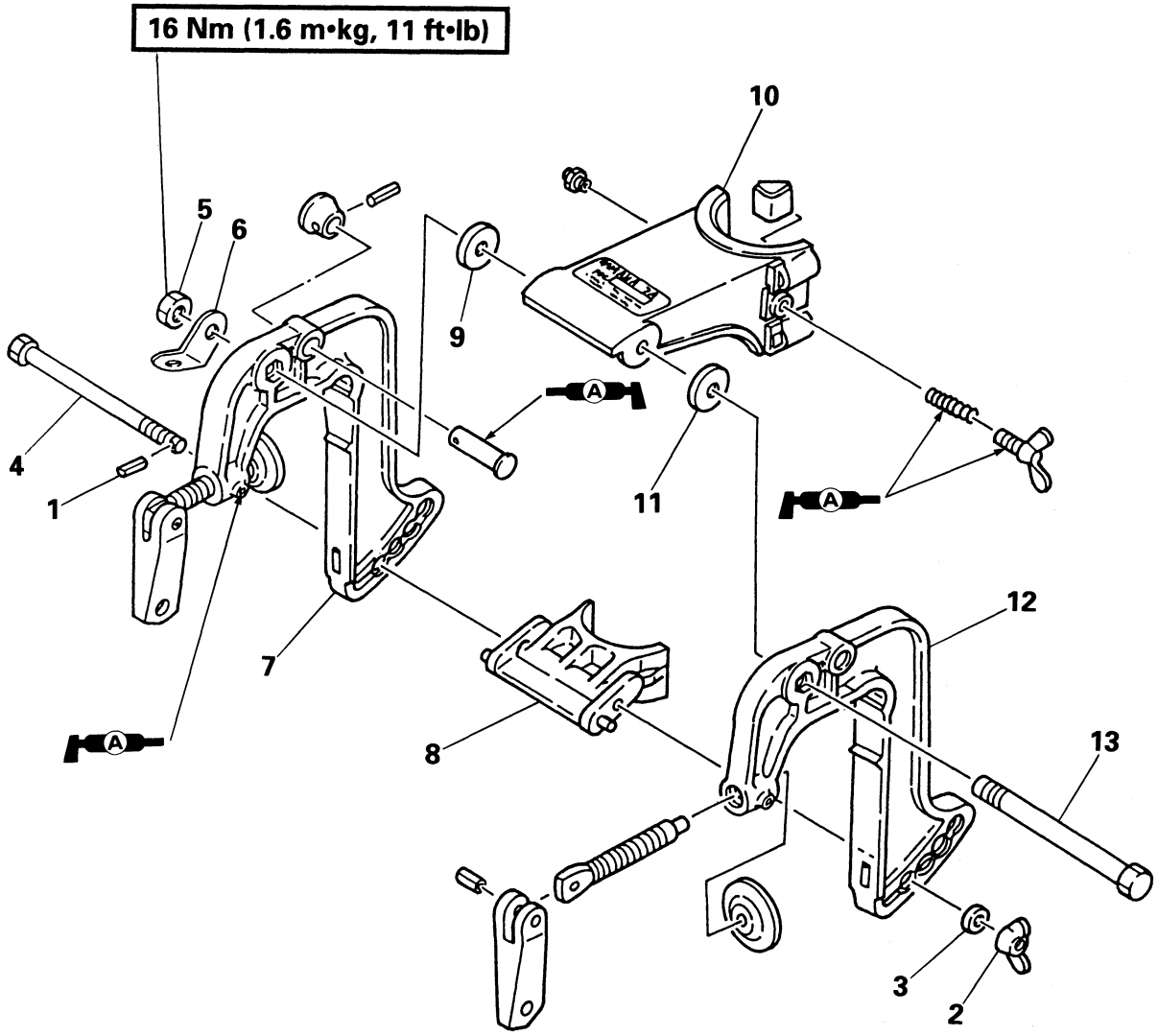
Pivot shaft bushing inspection

1. Inspect:
   - •Pivot shaft bushing
     Wear/Crack/Damage → Replace.

Tiller handle inspection

1. Inspect:
   - •Tiller handle
     Wear/Crack/Damage → Replace.

CLAMP BRACKET
EXPLODED DIAGRAM



REMOVAL AND INSTALLATION CHART

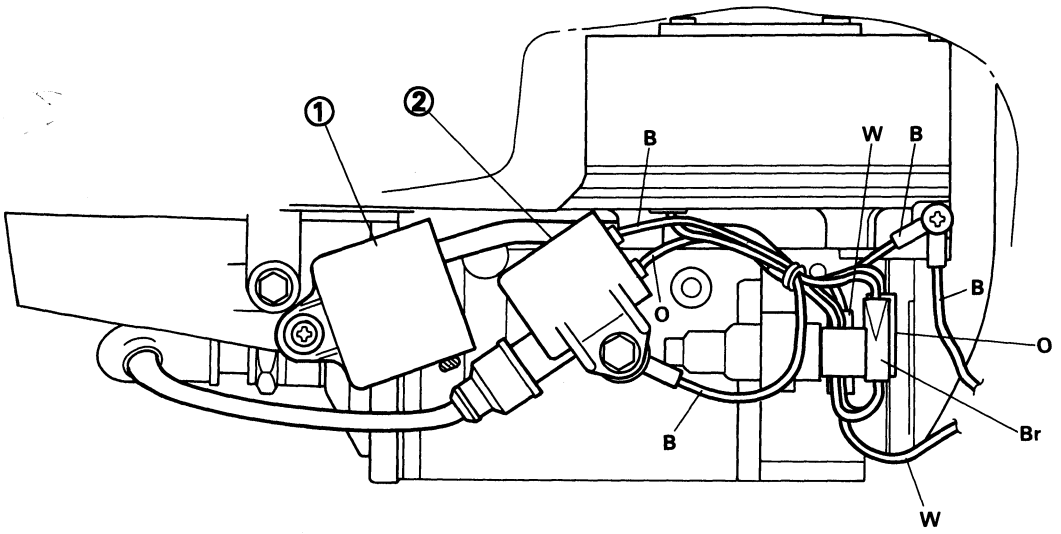
Step	Procedure/Part name	Q'ty	Service points
	CLAMP BRACKET REMOVAL		Follow the left "Step" for removal.
	Upper case assembly		Refer to "UPPER CASE AND TILLER HANDLE"
1	Spring pin	1	
2	Wing nut	1	
3	Plane washer	1	
4	Bolt	1	
5	Nut	1	
6	Clamp bracket plate	1	
7	Clamp bracket RH	1	
8	Thrust bracket	1	
9	Plane washer	1	
10	Swivel bracket	1	
11	Plane washer	1	
12	Clamp bracket LH	1	
13	Bolt	2	
			Reverse the removal steps for installation.

CHAPTER 8
ELECTRICAL SYSTEM

ELECTRICAL COMPONENTS

① CDI unit
② Ignition coil

B : Black
Br : Brown
O : Orange
W : White



ELECTRICAL ANALYSIS

INSPECTION

CAUTION:

All measuring instruments should be handled with special care, or the correct measurement is impossible.
On an instrument powered by dry batteries, they should be checked for voltage periodically and replaced, if necessary.

NOTE:

"O---O" indicates the terminals between which there is a continuity of electricity; i.e., a closed circuit at the respective switch position.

Low resistance measurement

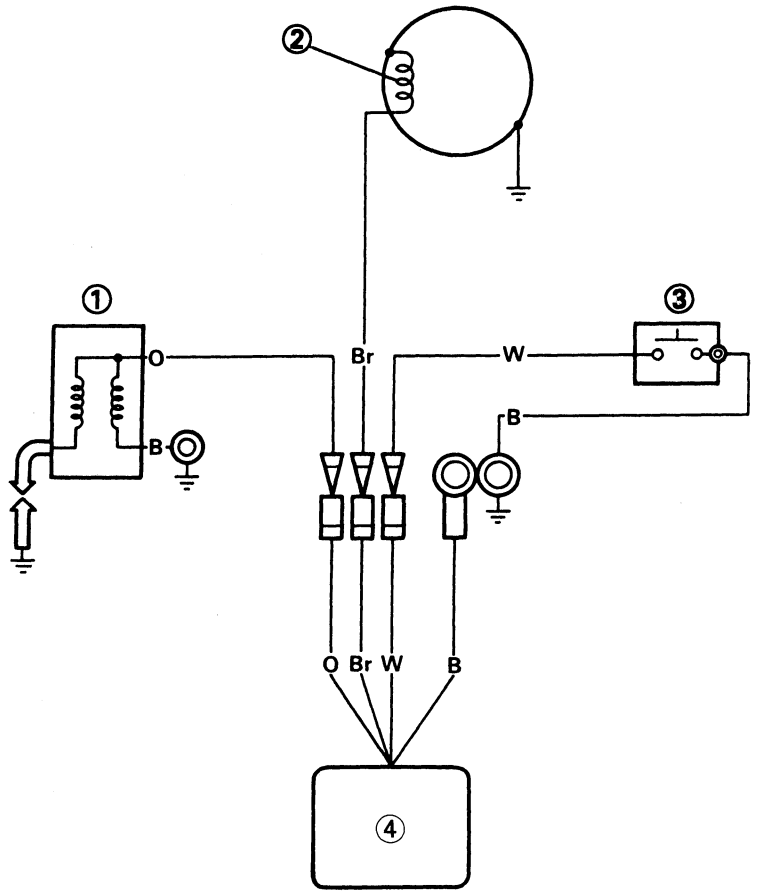
When measuring the resistance of 10 Ω or less using the digital tester, the correct measurement cannot be obtained because of the tester's internal resistance.
To obtain the correct value, subtract this internal resistance from the displayed measurement.

Correct value =
Displayed measurement - Internal resistance

NOTE:

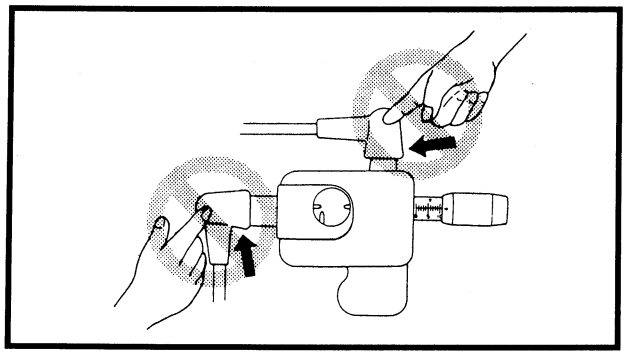
The internal resistance of the tester can be obtained by connecting both of its terminals.

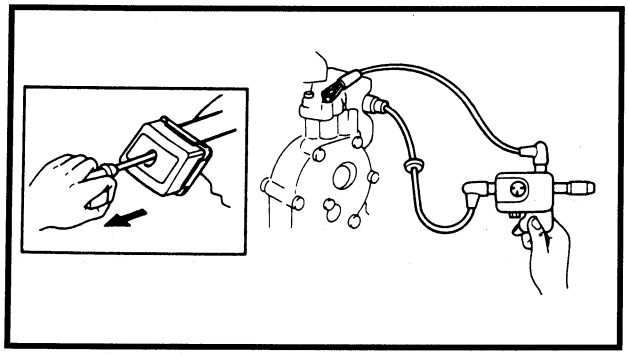
IGNITION SYSTEM

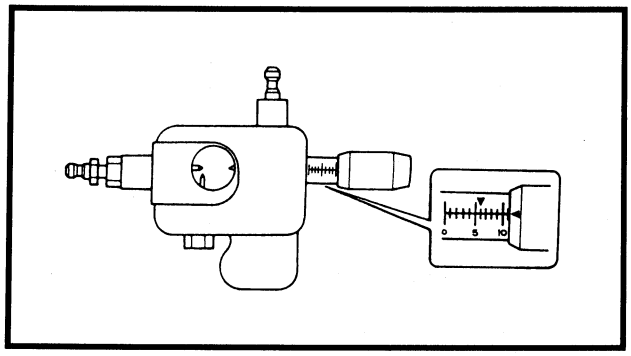


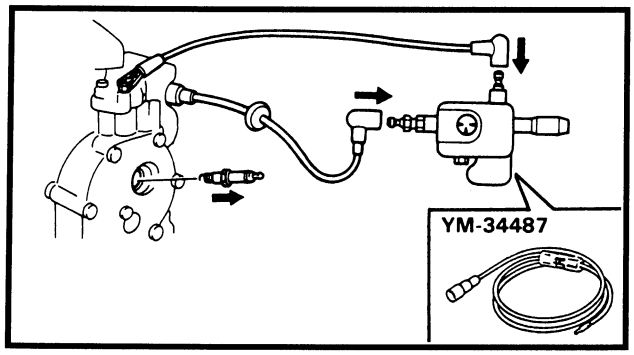
① Ignition coil
② Charge coil
③ Stop switch
④ CDI unit

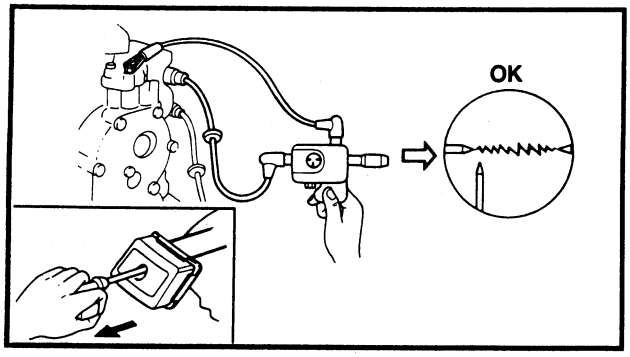
B : Black
Br : Brown
O : Orange
W : White











IGNITION SPARK GAP

⚠ WARNING

•While taking spark check be careful not to touch any connection of lead wires of the 'Ignition spark gap tester".
•When doing the spark test, take special care not to allow leakage from the removed plug cap.
•This check is likely to produce sparks, so be sure that no flammable gas or fluid is in the vicinity.

1. Check:
   •Ignition spark gap
   Out of specification → Replace.

Spark gap:
9 mm (0.35 in)

Checking steps:
•Adjust the spark gap to specification by turning the adjusting knob.

Spark gap tester:
YM-34487/90890-06754

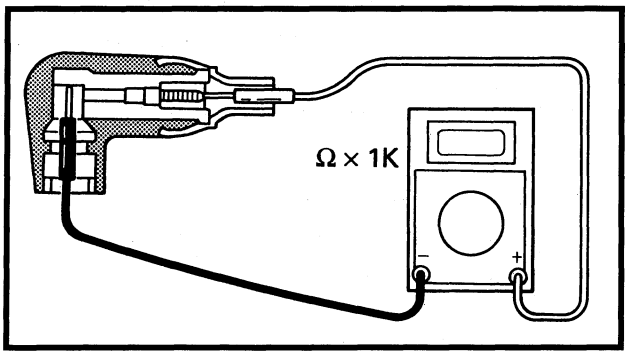
•Connect the spark-plug cap to the spark gap tester.
•Remove the spark plug from the engine.
•Cranking the engine and check sparks of ignition system seen through discharge window.

SPARK PLUG

Refer to "GENERAL" section in chapter 3.

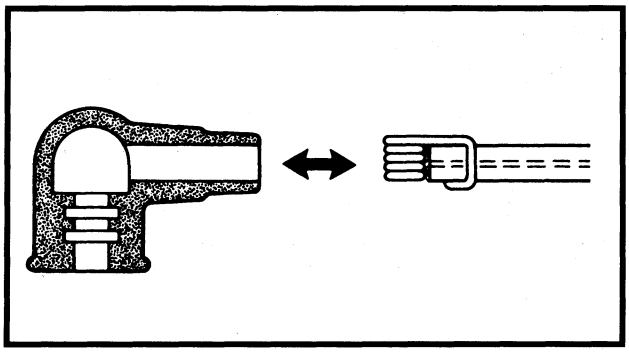
SPARK PLUG CAP

1. Inspect:
   - •Spark plug cap
     Loosen → Tighten.
     Crack/Damage → Replace.



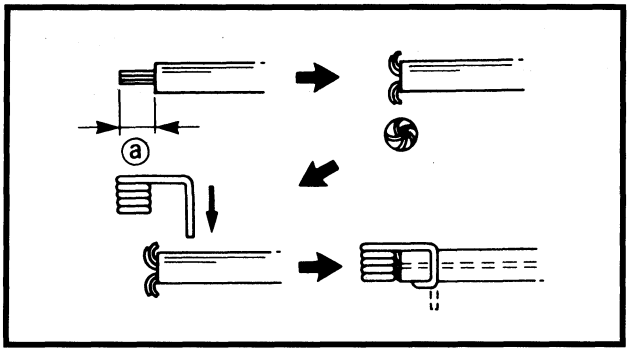
2. Measure: (For Canada and Europe)
   - •Spark plug cap resistance
     Out of specification → Replace.

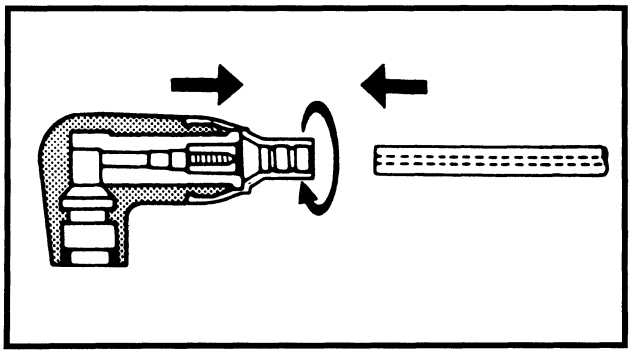
Spark plug cap resistance:
4.0 ~ 6.0 kΩ



Replacement steps: (Except for Canada and Europe)

- •Remove the spark-plug cap by pulling the spark-plug cap.
- •Remove the plug-cap spring.
- •Strip the insulation cover 5 mm (0.2 in) ⓐ and spread the core wires outward.
- •Fit the plug-cap spring close to the spread core wires and bend the spring end for clamping.
- •Install the plug-cap spring into the spark-plug cap.





Replacement steps: (For Canada and Europe)

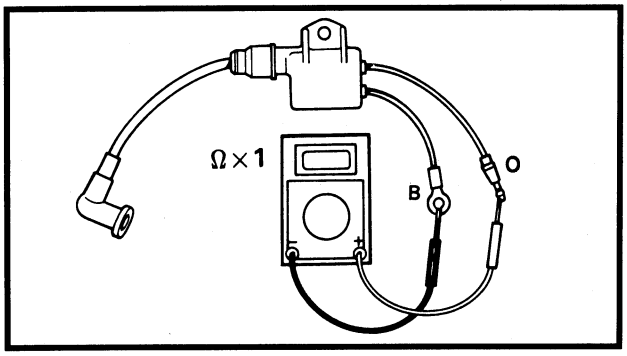
- •Remove the spark-plug cap by turning the cap counterclockwise.
- •Install the spark-plug cap by turning the cap clockwise until it stops.

IGNITION COIL

1. Inspect:
   •High tention cord
   Crsck/Damage → Replace.

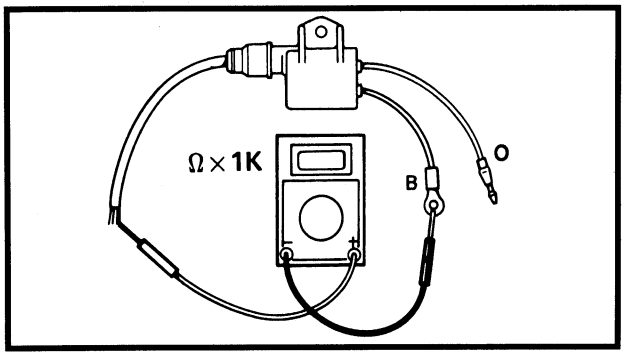
2. Measure:
   •Secondary coil resistance
   Out of specification →Replace.

Primary coil resistance :
Orange (O) - Black (B)
0.18 ~ 0.24 Ω at 20°C (68°F)



NOTE:

When measuring the resistance of 10 Ω or less using the digital tester, the correct measurement cannot be obtained. Refer to "Lower resistance measurement".



3. Measure:
   •Secondary coil resistance
   Out of specification → Replace.

Secondary coil resistance :
Orange (O) - High tension cord
2.7 ~ 3.7 kΩ at 20°C (68°F)

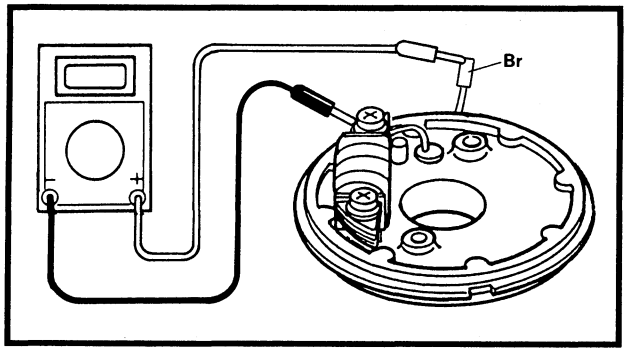
NOTE:

Remove the spark-plug cap from high tension cord.

STOP SWITCH

1. Check:
   •Continuity
   Out of specification → Replace.

	Checking leads color White (W) - Black (B)
Free	Discontinuity
Push the button	Continuity



CHARGE COIL

1. Measure:
   •Charge coil resistance
   Out of specification → Replace.

Charge coil resistance:
Brown (Br) - Earth
316.8 ~ 387.2 Ω at 20 °C (68°F)

CDI UNIT

1. Measure:
   •CDI unit resistance
   Out of specification → Replace.

Pocket tester
YU-03112/90890-03112

Unit: kΩ

⊖ \ ⊕	W	B	Br	O
W		•	∞	•
B	2.2~9.5		2.2~9.5	•
Br	∞	•		•
O	7~30	2~9	7~30	

NOTE:

- The resistance values will vary from meter to meter, especially with electronic digital meters. For some testers, polarity of leads is reversed.
- "•" indicates that the pointer deflects once and returns to specification.
- "∞" mark indicates discontinuity.

CHAPTER 9
TROUBLE ANALYSIS

TROUBLE ANALYSIS

NOTE:

Following items should be obtained before "trouble analysis".
1.There is no incorrect wiring connection.
2.Wiring connections are surely engaged and without any rust.

TROUBLE ANALYSIS CHART

Trouble mode							Check elements	
ENGINE WILL NOT START	ROUGH IDLING	ENGINE STALLS	ENGINE WILL NOT STOP	POOR PERFORMANCE	OVERHEATING	LOOSE STEERING	Relative part	Reference Chapter
				FUEL SYSTEM				
O	O	O		O			Carburetor	4
	O	O					Idle speed	3
				POWER UNIT				
O	O			O			Compression	5
O	O			O			Reed valve	5
O	O						Cylinder head gasket	5
O				O			Piston ring	5
O				O			Cylinder block	5
O				O			Seal	5
O				O			Crankcase	5
O							Piston	5
				O			Bearing	5
					O		Water passage	5
				LOWER UNIT				
O							Gear	6
				O	O		Water inlet	6
				O	O		Water pump	6
				O			Propeller shaft	6
							Lower case	6
				BRACKET UNIT				
						O	Bracket	7
				ELECTRICAL				
O	O	O	O	O	O		Ignition system	8

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