



ELECTRÓNICA Y ELECTRICIDAD PARA VEHÍCULOS

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YAMAHA
Marine

Outboards

160

6V, 8V

**SERVICE
MANUAL**

NOTICE

This manual has been prepared by the Yamaha Motor Company Ltd. 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.

**6V, 8V
SERVICE MANUAL**
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1st. Edition, July 1996
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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 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.

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	6MH (USA, CANADA) 6CM	6CEM	8MH (USA, CANADA) 8CM	8CEM
Indication	6CM	6CEM	8CM	8CEM

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.

HOW TO READ DESCRIPTIONS

1. An easy-to-see disassembly illustration is mainly provided for a disassembly job.
2. Numbers are given in the order of a disassembly job in the disassembly illustration.
3. An explanation of jobs and notes is presented in an easy-to-read way by the use of symbol marks. The meanings of the symbol marks are given on the next page.
4. A job instruction chart accompanies the assembly illustration, providing the order of jobs, names of parts, notes in jobs, etc.
5. In addition to the disassembly illustration, "REMOVAL POINTS" is provided to supplement in detail the explanation which does or cannot necessarily cover the main jobs.
6. Jobs necessary before and after those which are not included in the disassembly illustration are explained before the same illustration as related jobs.

- ① Section
- ② Preparation for removal
- ③ Order of removal
- ④ Part name
- ⑤ Q'ty

- ⑥ Remarks
- ⑦ Removal points
- ⑧ Extent of removal
- ⑨ Symbol mark
- ⑩ Exploded diagram

POWR CYLINDER HEAD, VALVE AND CAMSHAFT

CYLINDER HEAD, VALVE AND CAMSHAFT

PREPARATION FOR REMOVAL

- Remove the power unit.
- Remove the following parts:
 - CDI unit
 - Ignition coil
 - Magneto base
 - Rectifier regulator
 - Flywheel magneto
 - Timing belt

Extent of removal:

Extent of removal	Order	Part name	Qty	Remarks
①	1	Bolt	3	
	2	Intake manifold	1	
	3	Bolt	1	
	4	Head cover	1	
	5	Bolt	6	
	6	Cylinder head	1	Refer to "REMOVAL POINTS".
	7	Oil pump assembly	1	
	8	Adjust screw	4	Loosen the screw. Refer to "REMOVAL POINTS".
	9	Valve lifter	2	
	10			
	11	Rocker shaft	2	
	12	Rocker arm	4	
	13	Bolt	1	
	14	Driven gear	1	
	15	Camshaft	1	
	16	Valve cover	4	
	17	Valve (intake)	2	
	18	Spring retainer	2	
	19	Valve (exhaust)	2	Refer to "REMOVAL POINTS".

REMOVAL POINTS

CYLINDER HEAD

1. Remove:
 - Cylinder head ①

NOTE:

- To remove the cylinder head, insert a bar between the cylinder head and cylinder body, and then separate it.
- Do not to scratch the gasket surfaces by the screw driver.

ROCKER SHAFT

1. Loosen:
 - Lock nut ①
 - Adjust bolt ②

Valve adjuster: YB-2526/00000-01311

POWR CYLINDER HEAD, VALVE AND CAMSHAFT

CYLINDER HEAD, VALVE AND CAMSHAFT

NOTE ON REMOVAL AND REASSEMBLY

- Before servicing, clean the power unit.
- Remove any gasket adhered to the contacting surfaces.
- Take care not to scratch the contacting surfaces when removing the cylinder and cylinder head.
- For reassembly, the removed parts should be cleaned with solvent, and apply the gear oil to the sliding surfaces.

Extent of removal:

Extent of removal	Order	Part name	Qty	Remarks
①	1	Bolt	3	
	2	Intake manifold	1	
	3	Bolt	1	
	4	Head cover	1	
	5	Bolt	6	
	6	Cylinder head	1	Refer to "REMOVAL POINTS".
	7	Oil pump assembly	1	
	8	Adjust screw	4	Loosen the screw. Refer to "REMOVAL POINTS".
	9	Valve lifter	2	
	10			
	11	Rocker shaft	2	
	12	Rocker arm	4	
	13	Bolt	1	
	14	Driven gear	1	
	15	Camshaft	1	
	16	Valve cover	4	
	17	Valve (intake)	2	
	18	Spring retainer	2	
	19	Valve (exhaust)	2	Refer to "REMOVAL POINTS".

REMOVAL POINTS

CYLINDER HEAD

1. Remove:
 - Cylinder head ①

NOTE:

- To remove the cylinder head, insert a bar between the cylinder head and cylinder body, and then separate it.
- Do not to scratch the gasket surfaces by the screw driver.

ROCKER SHAFT

1. Loosen:
 - Lock nut ①
 - Adjust bolt ②

Valve adjuster: YB-2526/00000-01311

A	3 Nm (0.2 mkg, 14 Pds)
B	8 Nm (0.8 mkg, 6.8 Pds)
C	13 Nm (1.3 mkg, 8.4 Pds)
D	18 Nm (1.8 mkg, 12 Pds)
E	1st: 15 Nm (1.5 mkg, 11 Pds) 2nd: 30 Nm (3.0 mkg, 22 Pds)

6-23

6-24

WARNINGS, CAUTIONS AND NOTES

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

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

⚠ WARNING

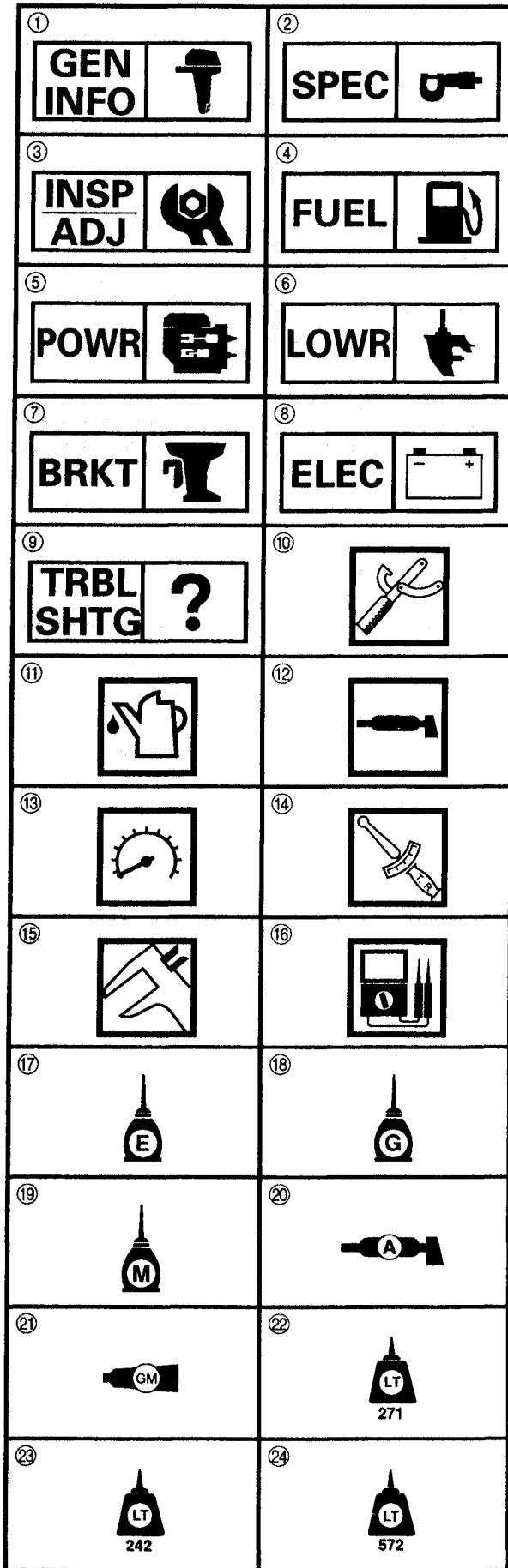
Failure to follow WARNING instruction could result in severe injury or death to the machine operator, a bystander, or a person inspecting or repairing the outboard motor.

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.



A50001-1-4

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 Troubleshooting

Symbols ⑩ to ⑯ indicate specific data:

- ⑩ Special tool
- ⑪ Specified liquid
- ⑫ Specified grease
- ⑬ Specified engine speed
- ⑭ Specified torque
- ⑮ Specified measurement
- ⑯ Specified electrical value
[Resistance (Ω), Voltage (V), Electric current (A)]

Symbol ⑰ to ㉐ in an exploded diagram indicate grade of lubricant and location of lubrication point:

- ⑰ Apply Yamaha 2-stroke outboard motor oil
- ⑱ Apply Yamaha gear-case lubricant
- ⑲ Apply molybdenum disulfide oil
- ⑳ Apply water resistant grease (Yamaha marine grease A, Yamaha marine grease)

Symbols ㉑ to ㉔ in an exploded diagram indicate grade of sealing or locking agent, and location of application point:

- ㉑ Apply Gasket Maker®
- ㉒ Apply LOCTITE® No. 271 (Red LOCTITE)
- ㉓ Apply LOCTITE® No. 242 (Blue LOCTITE)
- ㉔ Apply LOCTITE® No. 572

NOTE: _____

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

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SPECIFICATIONS	 SPEC	2
PERIODIC INSPECTION AND ADJUSTMENT	 INSP ADJ	3
FUEL SYSTEM	 FUEL	4
POWER UNIT	 POWR	5
LOWER UNIT	 LOWR	6
BRACKET UNIT	 BRKT	7
ELECTRICAL SYSTEM	 ELEC	8
TROUBLESHOOTING	 TRBL SHTG	9

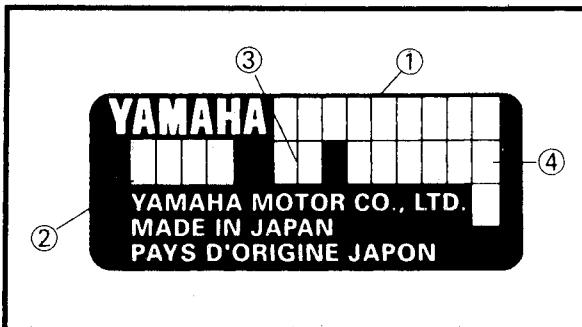
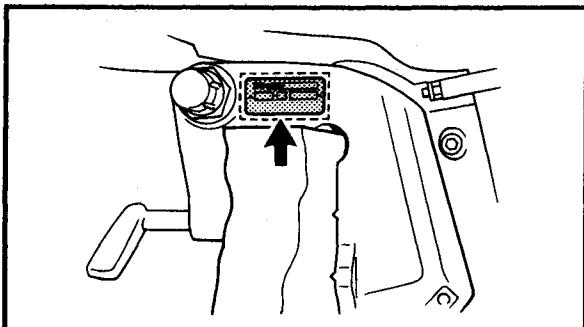


CHAPITRE 1

GENERAL INFORMATION

1

IDENTIFICATION.....	1-1
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A60000-1*

IDENTIFICATION SERIAL NUMBER

The serial number of the outboard motor is stamped on a plate attached to the port side of the clamp bracket.

NOTE:

As an antitheft measure, a special label on which the outboard motor serial number is stamped is bonded to the portside of the clamp 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:

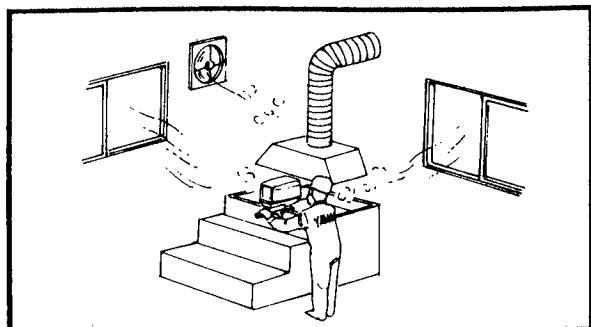
Model		Approved model code	Starting serial No.
World- wide	USA, CANADA		
6CM	6MH	6H6	S: 003802 ~ L: 303150 ~
6CEM	—		S: 100101 ~ L: 400101 ~
8CM	8MH	6G1	S: 008601 ~ L: 305566 ~
8CEM	—		UL: 700101 ~ S: 100101 ~ L: 100101 ~

**SAFETY WHILE WORKING**

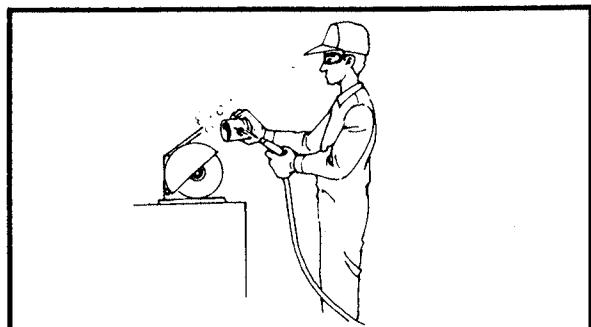
The procedures given in this manual are those recommended by Yamaha to be followed by Yamaha dealers and their mechanics.

**FIRE PREVENTION**

Gasoline (petrol) is highly flammable. Petroleum vapor is explosive if ignited. Do not smoke while handling, 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 practices, 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.



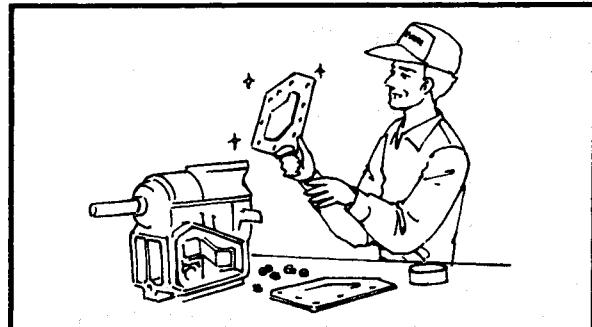
GOOD WORKING PRACTICES

1. The right tools

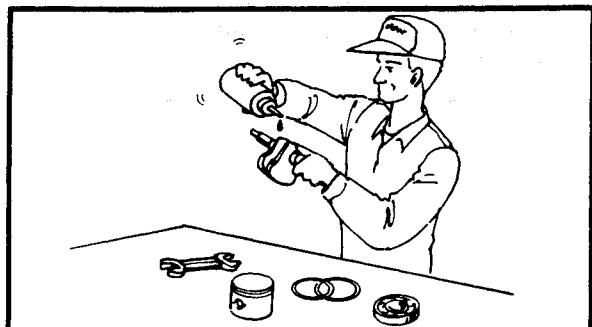
Use the special tools that are advised to protect parts from damage. Use the right tool in the right manner — don't improvise.

2. Tightening torque

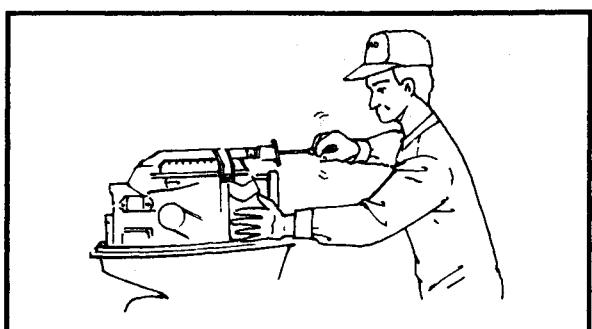
Follow the torque tightening instructions. When tightening bolts, nuts and screws, tighten the large sizes first, and tighten inner-positioned fixings before outer-positioned ones.

**3. Non-reusable items**

Always use new gaskets, packings, 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.



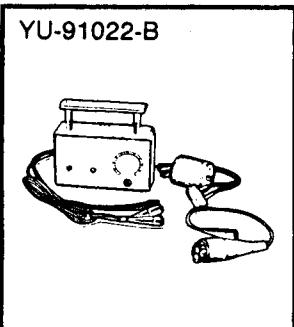
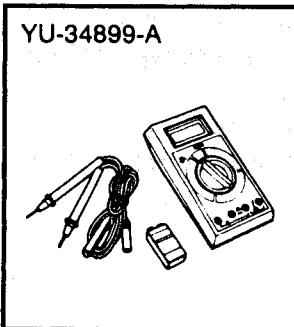
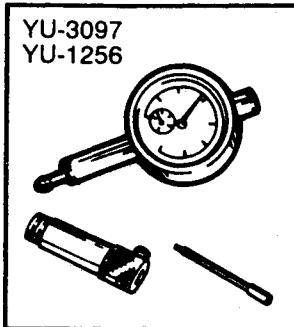
A80701-0*

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-".

**FOR TUNE-UP**

1. Dial gauge and stand
P/N. YU-3097, YU-1256
90890-01252

2. Digital multi meter
P/N. YU-34899-A
90890-06752

3. C.D.I. tester
P/N. YU-91022-B

**GEN
INFO****SPECIAL TOOLS**

YU-33223-1

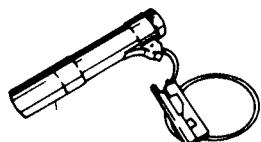


90890-06751

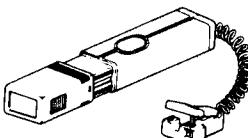


4. Compression gauge
P/N. YU-33223-1
90890-06751

YM-33277-A

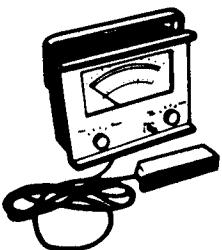


90890-03141

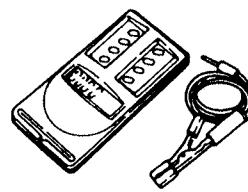


5. Timing light
P/N. YU-33277-A
90890-03141

YU-8036-A

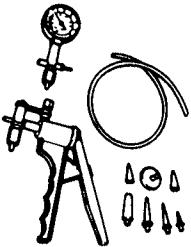


90890-06760

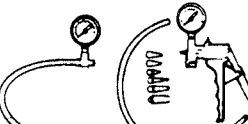


6. Tachometer
P/N. YU-8036-A
90890-06760

YB-35956

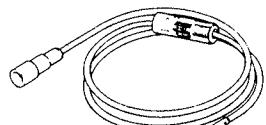


90890-06756

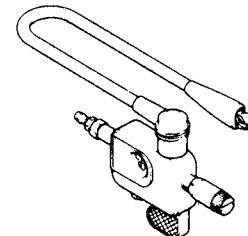


7. Mity Vac
P/N. YB-35956
90890-06756

YM-34487



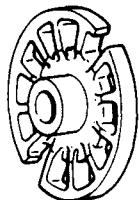
90890-06754



8. Spark gap tester
P/N. YB-34487
90890-06754



90890-01625

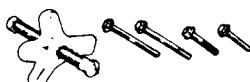


9. Tester propeller

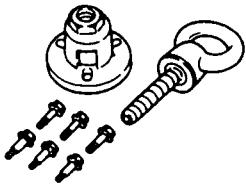
P/N.

90890-01625

YB-6117



90890-06521



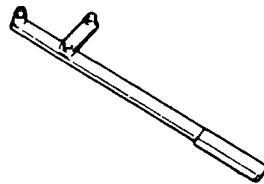
FOR POWER UNIT SERVICE

1. Flywheel puller

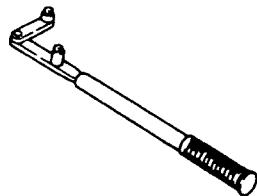
P/N. YB-6117

90890-06521

YB-6139



90890-06522

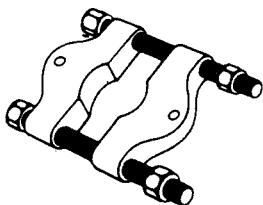


2. Flywheel holder

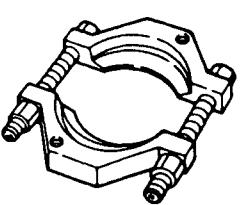
P/N. YB-6139

90890-06522

YB-6219



90890-06534

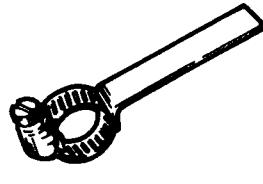


3. Bearing separator

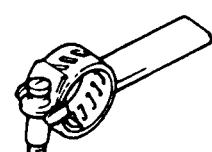
P/N. YB-6219

90890-06534

YB-6265



90890-06706



FOR LOWER UNIT SERVICE

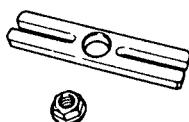
1. Backlash indicator

P/N. YB-6265

90890-06706



90890-06501

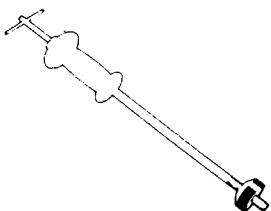


2. Stopper guide plate

P/N.

90890-06501

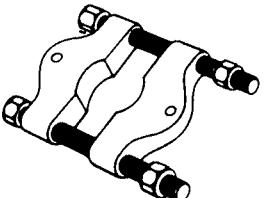
YB-6096



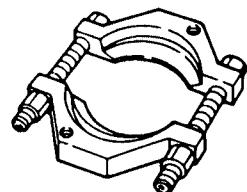
3. Slide hammer set

P/N. YB-6096

YB-6219



90890-06534



4. Bearing separator

P/N. YB-6219

90890-06534

90890-06535

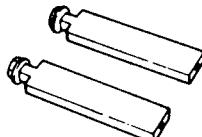


5. Bearing puller

P/N.

90890-06535

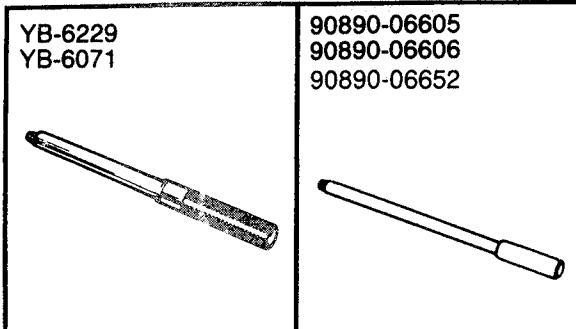
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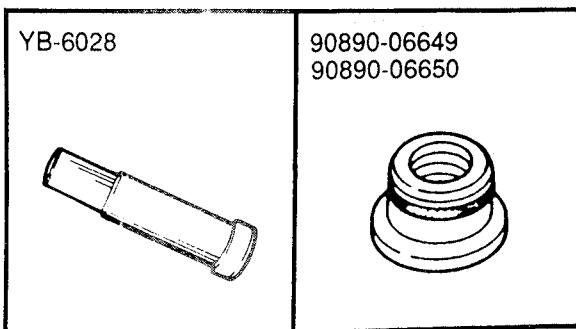
6. Stopper guide stand

P/N.

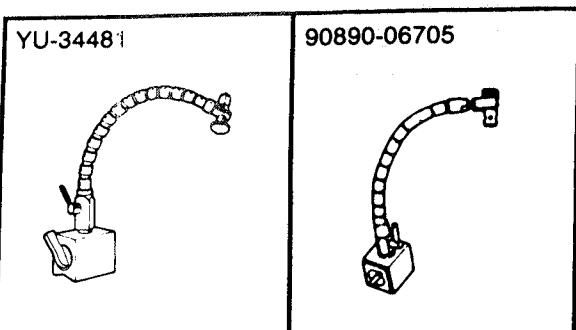
90890-06538



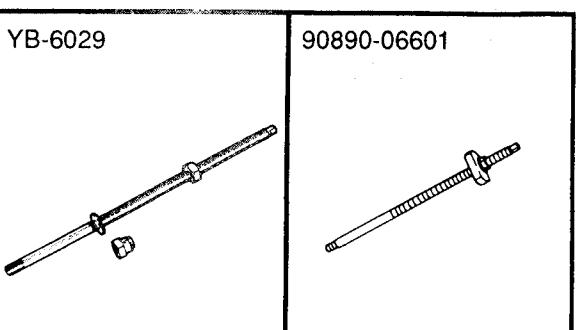
7. Drive rod
P/N. YB-6229, YB-6071
90890-06605
90890-06606
90890-06652



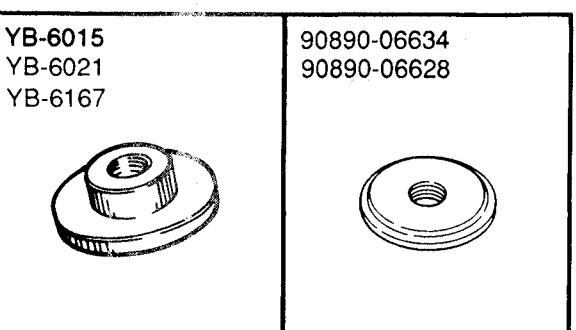
8. Bushing attachment
P/N. YB-6028
90890-06649
90890-06650



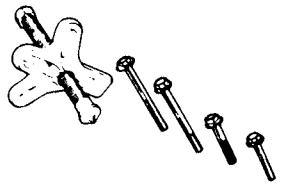
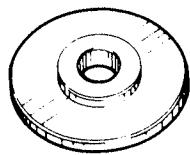
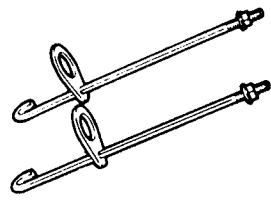
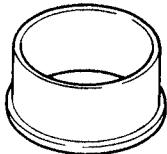
9. Magnet base
P/N. YU-34481
90890-06705



10. Bushing installer
P/N. YB-6029
90890-06601



11. Bearing (oil seal) installer
P/N. YB-6015, YB-6021, YB-6167
90890-06634
90890-06628

**YB-6117****12. Universal puller
P/N. YB-6117****YB-6169****13. Needle bearing installer
P/N. YB-6169****YB-06234****14. Bearing housing puller
P/N. YB-06234****90890-06645****15. Bearing inner race attachment
P/N.
90890-06645**



CHAPTER 2 SPECIFICATION

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MAINTENANCE SPECIFICATIONS 2-3

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 GENERAL TORQUE SPECIFICATIONS 2-9

SPEC**GENERAL SPECIFICATIONS****GENERAL SPECIFICATIONS**

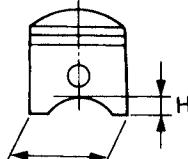
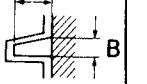
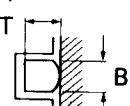
Item	Unit	Model					
		6CM	6CEM	8CM	8CEM		
Worldwide		6MH	—	8MH	—		
USA, CANADA							
MODEL CODE:		6M8		6N0			
DIMENSIONS:							
Overall length	mm (in)	802 (31.6)					
Overall width	mm (in)	343 (13.5)					
Overall height	S mm (in)	977 (38.5)					
	L mm (in)	1,104 (43.5)					
Boat transom height	UL mm (in)	—	1,167 (45.9)	—	—		
	S mm (in)	381 (15.0)					
	L mm (in)	508 (20.0)					
O/M transom height	UL mm (in)	—	635 (25.0)	—	—		
	S mm (in)	436 (17.2)					
	L mm (in)	563 (22.2)					
Weight	UL mm (in)	—	626 (24.6)	—	—		
	S kg (lb)	27 (59.5)	29 (63.9)	27 (59.5)	29 (63.9)		
	L kg (lb)	27.5 (60.6)	29.5 (65.0)	27.5 (60.6)	29.5 (65.0)		
	UL kg (lb)	—	28 (61.7)	—	—		
PERFORMANCE:							
Full throttle speed range	rpm	4,000 ~ 5,000					
Output (ISO)	kw (hp)/rpm	4.4 (6)/4,500					
Max fuel consumption	L (qt)/h at rpm	3.6 (8)/5,000					
ENGINE:							
Engine type		2-stroke					
Cylinder number		2					
Total displacement	cm ³ (cu. in)	165 (10.07)					
Bore × Stroke	mm × mm (in × in)	50 × 42 (1.97 × 1.65)					
Compression ratio		7.00					
Compression pressure	kPa (kg/cm ² , psi)	1,079 (10.8, 153)					
Carburetor number		1					
Intake system		Reed valve					
Scavenging system		Cross scavenging					
Exhaust system		Through prop boss					
Cooling system		Water					
Starting system		Manual	Manual & Electric	Manual	Manual & Electric		
Ignition system		CDI					
Advance type		Mechanical					
Alternator for charging	V-A	—	12-6	—	12-6		
Alternator for lighting	V-W	12-80	—	12-80	—		
Carburetor starting system		Choke valve type					
Spark plug	(NGK)	B7HS-10					

SPEC**GENERAL SPECIFICATIONS**

Item	Unit	Model				
		6CM	6CEM	8CM	8CEM	
Worldwide	6MH		—	8MH	—	
USA, CANADA						
Resistant spark plug (NGK)			BR7HS-10			
FUEL AND LUBRICATION:						
Fuel	P.O.N.*1	Regular gasoline				
Fuel rating		Min. 86				
Fuel type		Pre-mixed fuel & oil				
Engine oil type		2-stroke outboard motor oil				
Engine oil grade		TC-W3				
Mixing ratio (G)		100 : 1				
Gear oil type		Hypoid gear oil-SAE#80				
Gear oil quantity	cm^3 (US oz, Imp oz)	160				
		(5.4, 5.6)				
BRACKET:						
Tilt angle	degree	4, 8, 12, 16, 20				
Tilt-up angle		81				
Shallow water cruising angle		Tilt angle+37				
Steering angle (left + right)		60 + 60				
DRIVE UNIT:						
Gear shift position		F-N-R				
Gear ratio		13:27 (2.08)				
Gear type		Straight bevel gear				
Clutch type		Dog clutch				
Propeller direction		Clockwise (back view)				
Propeller drive system		Spline				
Propeller series mark		N				
ELECTRICAL:						
Battery capacity	Ah Amps	—		40	—	40
Cold cranking		—		210	—	210

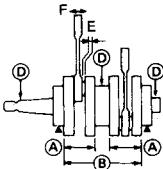
*1 : Pump Octane Number; (Reserch octane + Motor octane)/2

SPEC**MAINTENANCE SPECIFICATIONS****MAINTENANCE SPECIFICATIONS****ENGINE**

Item	Unit	Model			
		6CM	6CEM	8CM	8CEM
		6MH	—	8MH	—
CYLINDER:					
Bore size	mm (in)	50.00 ~ 50.03 (1.9685 ~ 1.9697)			
Wear limit	mm (in)	50.1 (1.972)			
Taper limit	mm (in)	0.08 (0.003)			
Out of round limit	mm (in)	0.05 (0.002)			
PISTON:					
Identification mark		G			
Piston clearance	mm (in)	0.040 ~ 0.045 (0.0016 ~ 0.0018)			
Limit	mm (in)	0.095 (0.0037)			
Diameter	mm (in)	49.955 ~ 49.980 (1.9667 ~ 1.9677)			
Measuring point H	mm (in)	10 (0.4)			
					
Off-set	mm (in)	0.5 (0.02)			
Off-set direction		Exhaust side			
Pin boss inside diameter	mm (in)	12.004 ~ 12.015 (0.4726 ~ 0.4730)			
Ring groove clearance (installed)	Top mm (in)	0.02 ~ 0.06 (0.0008 ~ 0.0024)			
	2nd mm (in)	0.03 ~ 0.07 (0.0012 ~ 0.0028)			
Over size piston diameter					
1st*	mm (in)	50.25 (1.978)*			
2nd	mm (in)	50.50 (1.988)			
PISTON PIN:					
Diameter	mm (in)	11.996 ~ 12.000 (0.4723 ~ 0.4724)			
PISTON RING (1ST):					
Type		Keystone			
Dimensions (B × T)	mm (in)	2.0 × 2.0 (0.079 × 0.079)			
End gap (installed)	mm (in)	0.15 ~ 0.35 (0.006 ~ 0.014)			
Limit	mm (in)	0.55 (0.022)			
					
PISTON RING (2ND):					
Type		Barrel			
Dimensions (B × T)	mm (in)	2.0 × 2.0 (0.079 × 0.079)			
					
End gap (installed)	mm (in)	0.15 ~ 0.35 (0.006 ~ 0.014)			
Limit	mm (in)	0.55 (0.022)			

* Except for U.S.A.

SPEC**MAINTENANCE SPECIFICATIONS**

Item	Unit	Model							
		6CM	6CEM	8CM	8CEM				
		6MH	—	8MH	—				
CRANK SHAFT:									
Crank width "A"	mm (in)	39.90 ~ 39.95 (1.571 ~ 1.573)							
Crank width "B"	mm (in)	101.7 ~ 102.0 (4.004 ~ 4.016)							
Deflection limit "D"	mm (in)	0.03 (0.0012)							
Crank shaft side clearance "E"	mm (in)	0.2 ~ 0.7 (0.008 ~ 0.027)							
Maximum small end axial play "F"	mm (in)	2.0 (0.08)							
									
THERMOSTAT:									
Opening temperature	°C (°F)	48 ~ 52 (118 ~ 126)							
Full-opening temperature	°C (°F)	60 (140)							
Valve lift	mm (in)	More than 3 (0.12)							
REED VALVE:									
Valve stopper height	mm (in)	4.5 ± 0.2 (0.177 ± 0.008)							
Valve warpage limit	mm (in)	0.2 (0.008)							
CARBURETOR:									
Identification Mark		6H601		6G101					
Float height	mm (in)	14 ± 2.0 (0.55 ± 0.08)							
Valve seat size	mm (in)	1.2 (0.047)							
Main jet (M.J.)		#98							
Main nozzle (M.N.)	mm (in)	2.2 (0.087)		2.4 (0.094)					
Pilot jet (P.J.)		#45							
Pilot screw (P.S.)	turns out	1-1/8 ± 1/4							
Idle speed	rpm	900 ± 50							
Trolling speed	rpm	800 ± 50							
RECOIL STARTER:									
Starter rope length	mm (in)	1,850 (72.8)							

SPEC**MAINTENANCE SPECIFICATIONS****LOWER**

Item	Unit	Model			
		6CM	6CEM	8CM	8CEM
		6MH	—	8MH	—
GEAR BACKLASH:					
Pinion-forward (S.S.T.)	mm			0.25 ~ 0.75	
Pinion-reverse (S.S.T.)	mm			0.25 ~ 0.75	
Pinion shims	mm			1.9/2.0/2.1/2.2	
Forward shims	mm			0.10/0.12/0.15/0.18/0.30/0.40/0.50	
Reverse shims	mm			0.10	
PROPELLER:					
Size (Blade × diameter × pitch)	in			3 × 8 1/2 × 6 1/2 – N	
				3 × 8 1/2 × 7 1/2 – N	
				3 × 8 1/2 × 8 1/2 – N	
				3 × 9 × 5 – N	
				3 × 9 × 7 – N	
TEST PROPELLER		90890-01625		90890-01625	
Engine speed	rpm	4,500 ~ 4,700		5,300 ~ 5,500	

ELECTRICAL

Item	Unit	Model			
		6CM	6CEM	8CM	8CEM
		6MH	—	8MH	—
IGNITION TIMING:					
Ignition timing (at full retarded)	degree			B.T.D.C. 4 ± 1	
(at full advanced)	degree			B.T.D.C. 35 ± 1	
Piston position (at full retarded)	mm (in)			B.T.D.C. 0.08 ± 0.04 (0.0031 ± 0.0016)	
(at full advanced)	mm (in)			B.T.D.C. 4.79 ± 0.26 (0.189 ± 0.010)	
STARTER MOTOR:					
Output	kW	—	0.4	—	0.4
Brush length	mm (in)	—	7.5 (0.30)	—	7.5 (0.30)
Wear limit	mm (in)	—	4.5 (0.18)	—	4.5 (0.18)
Commutator diameter	mm (in)	—	20.0 (0.79)	—	20.0 (0.79)
Limit	mm (in)	—	19.4 (0.76)	—	19.4 (0.76)
Clutch type			Over running	—	Over running
Rating	Sec.	—	30	—	30
STARTER RELAY:					
Rating	V/Sec.	—	12/30	—	12/30

SPEC**MAINTENANCE SPECIFICATIONS**

Item	Unit	Model			
		6CM 6MH	6CEM —	8CM 8MH	8CEM —
Worldwide					
USA, CANADA		6MH	—	8MH	—
NEUTRAL SWITCH:					
Distance A (ON)	mm (in)	—	18.5 ~ 19.5 (0.73 ~ 0.77)	—	18.5 ~ 19.5 (0.73 ~ 0.77)
Distance B (OFF)	mm (in)	—	19.6 ~ 20.5 (0.77 ~ 0.81)	—	19.6 ~ 20.5 (0.77 ~ 0.81)
FUSE:					
Rating	V/A	—	12/10	—	12/10
STATOR ASSEMBLY:					
Pulser coil resistance	Ω		92 ~ 112 (W/R-B)		
Charge coil resistance	Ω		81 ~ 99 (Br-B)		
Lighting voltage (minimum)	V/rpm		12/3,000		
Lighting voltage (maximum)	V/rpm		13.5 ~ 16.5/5,500		
Lighting coil resistance	Ω		0.36 ~ 0.44 (G-G)		
Pole number			4		
IGNITION COIL:					
Primary coil resistance	Ω		0.25 ~ 0.35 (O-B)		
Secondary coil resistance	kΩ		6.8 ~ 10.2 (high tension cords)		
SPARK PLUG:					
Gap	mm (in)		0.9 ~ 1.0 (0.035 ~ 0.039)		
(resistance)	mm (in)		0.9 ~ 1.0 (0.035 ~ 0.039)		

SPEC

MAINTENANCE SPECIFICATIONS

Item	Unit	Model			
		6CM	6CEM	8CM	8CEM
Worldwide					
USA, CANADA		6MH	—	8MH	—

C.D.I. UNIT:

Resistance

KΩ

(-)	(+)	W	B	Br	W/R	O
W			∞	∞	∞	∞
B		∞		7.5 ~ 11.3	∞	•
Br		∞	63.2 ~ 94.8		∞	•
W/R		8.8 ~ 13.2	14.4 ~ 21.6	30.4 ~ 45.6		•
O		∞	∞	∞	∞	

• : Needle swings once and returns to home position.

∞ : Discontinuity

B : Black

Br : Brown

G : Green

O : Orange

W : White

W/R : White/Red

RECTIFIER-REGULATOR:

6CM	✓	6CEM	
8CM	✓	8CEM	

(-)	(+)	R	G	G/W	B
R			∞	∞	∞
G		○		∞	∞
G/W		○	∞		∞
B		○	○	○	

○ : Continuity

∞ : Discontinuity

B : Black

G : Green

G/W : Green/White

R : Red

RECTIFIER:

6CM		6CEM	✓
8CM		8CEM	✓

(-)	(+)	R	G1	G2	B
R			∞	∞	∞
G1		○		∞	∞
G2		○	∞		∞
B		○	○	○	

○ : Continuity

∞ : Discontinuity

B : Black

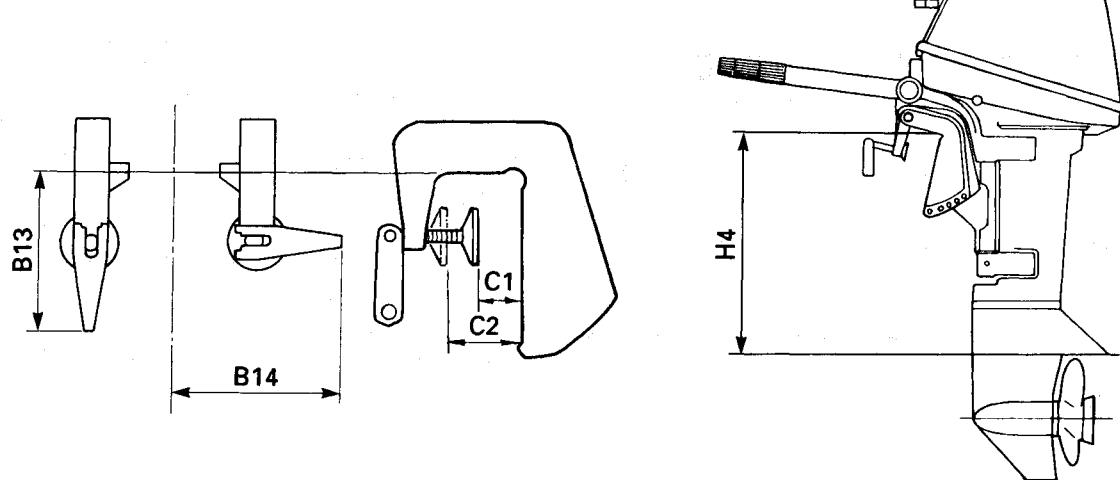
G1,2: Green

R : Red



DIMENTION

Item	Unit	Model			
		6CM	6CEM	8CM	8CEM
		6MH	—	8MH	—
H4	(S)	mm (in)		436 (17.2)	
	(L)	mm (in)		563 (22.2)	
	(UL)	mm (in)		626 (24.6)	
B13		mm (in)		115 (4.5)	
B14		mm (in)		128 (5.0)	
C1		mm (in)		19 (0.75)	
C2		mm (in)		60 (2.36)	



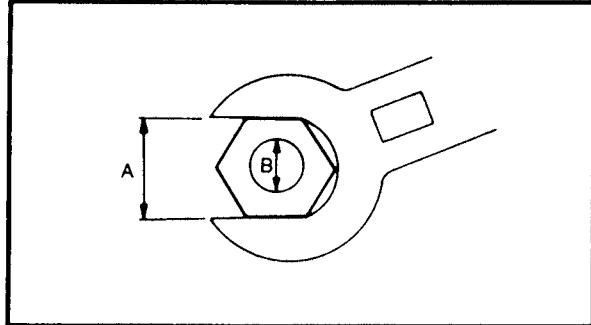
SPEC**MAINTENANCE SPECIFICATIONS****TIGHTENING TORQUE**

Part to be tightened	Part name	Thread size	Q'ty	Tightening torque			Remarks	
				Nm	m · kg	ft · lb		
ENGINE:								
Crank case	1st	Bolt	M6	10	6	0.6	4.3	242
	2nd				11	1.1	8.0	
Cylinder head cover	1st	Bolt	M6	7	4	0.4	2.9	
	2nd				8	0.8	5.8	
Exhaust cover	1st	Bolt	M6	7	4	0.4	2.9	572
	2nd				8	0.8	5.8	
Flywheel		Nut	M10	1	45	4.5	32	
Spark plug		Bolt	M14	2	25	2.5	18	
UPPER CASING AND GEAR CASE:								
Clamp bracket		Nut	M8	1	7	0.7	5.1	
Water pump housing		Bolt	M6	4	11	1.1	8.0	572
Propeller		Nut	M10	1	17	1.7	12	

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 SPECIFICATIONS

This chart specifies the torque 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 multi-fastener assemblies in crisscross fashion, in progressive stages until the specified torque is reached.





CHAPTER 3

PERIODIC INSPECTION AND ADJUSTMENT

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INSP**PREDELIVERY SERVICE****PREDELIVERY SERVICE****CONTENTS**

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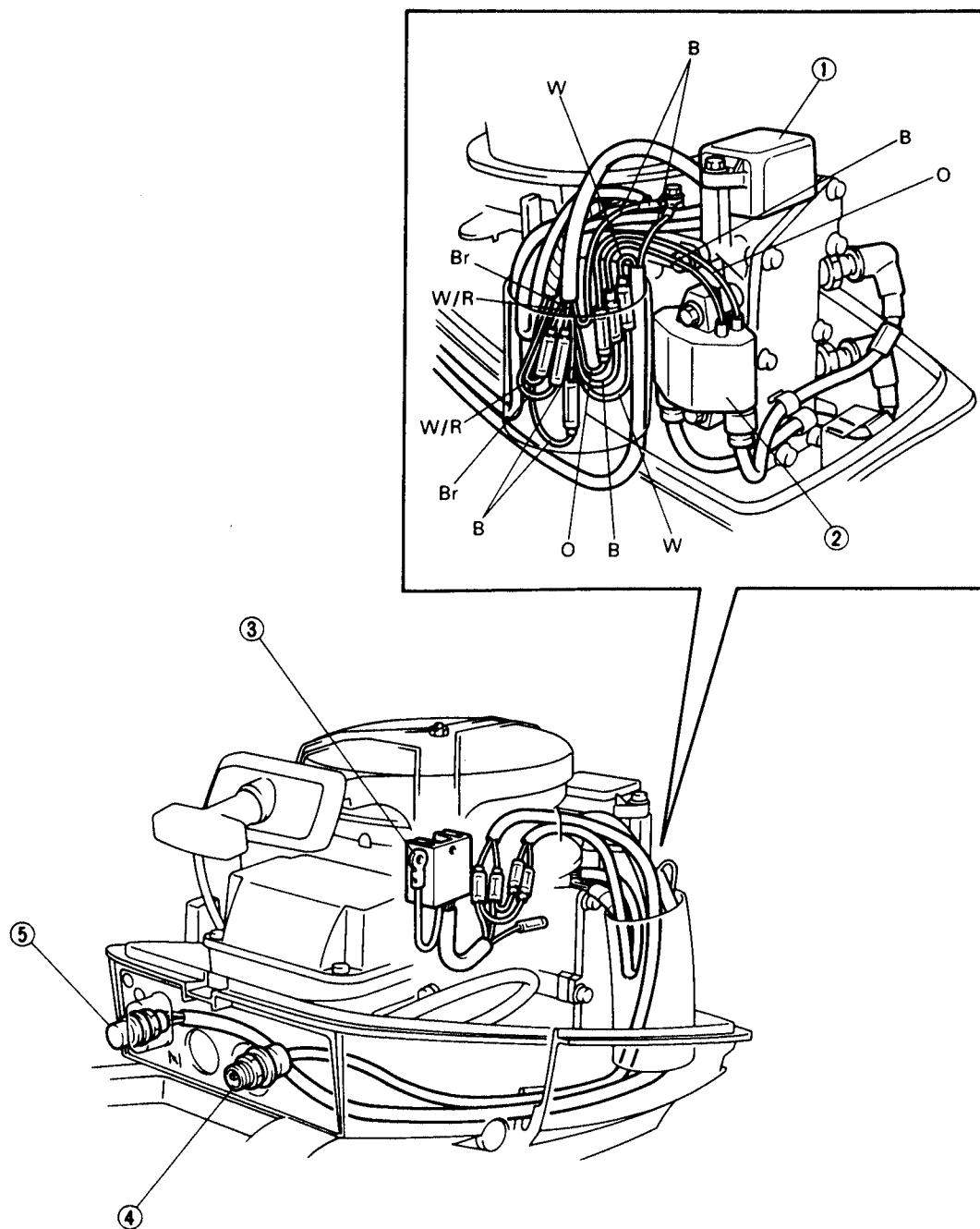
**INSP
ADJ****PREDELIVERY SERVICE****ELECTRICAL WIRING**

BCM	<input checked="" type="checkbox"/>	8CEM	
BCM	<input checked="" type="checkbox"/>	8CEM	

- ① C.D.I. unit
- ② Ignition coil
- ③ Rectifier regulator*
- ④ 2P connector*
- ⑤ Engine stop switch

* For Europe model

- B : Black
- Br : Brown
- G : Green
- G/W : Green/White
- O : Orange
- R : Red
- W : White
- W/R : White/Red

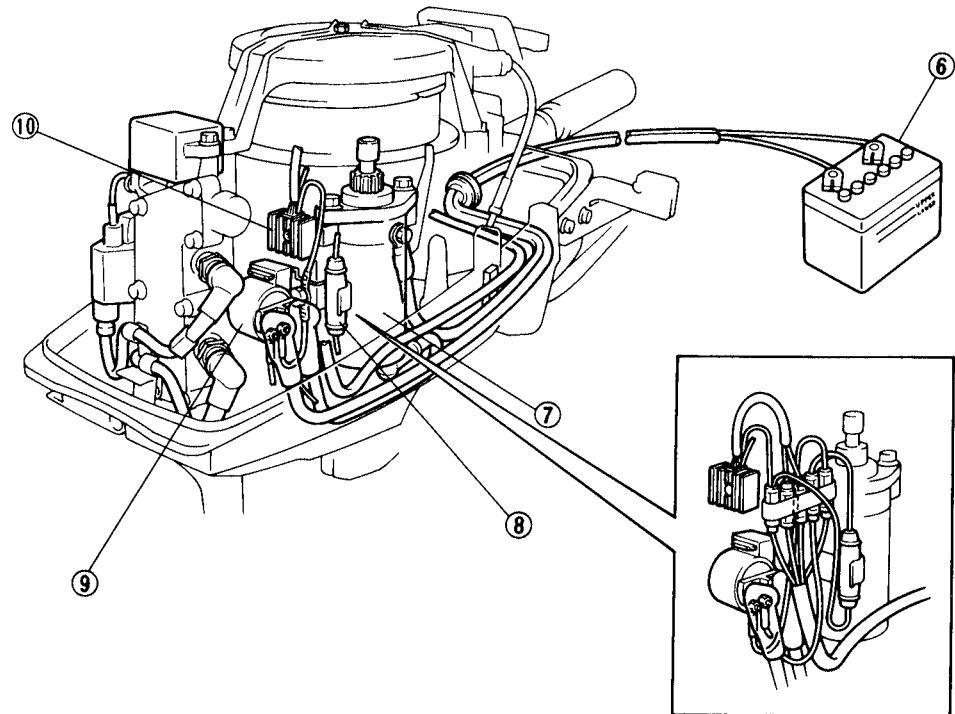
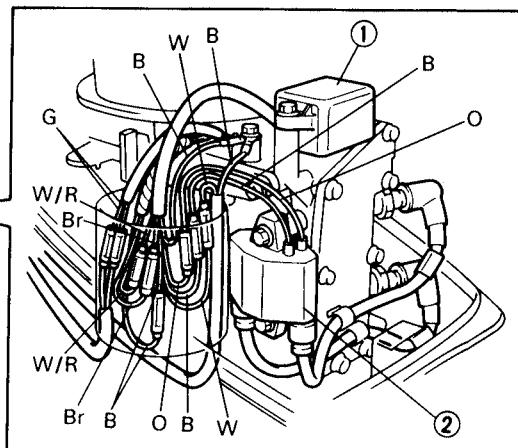
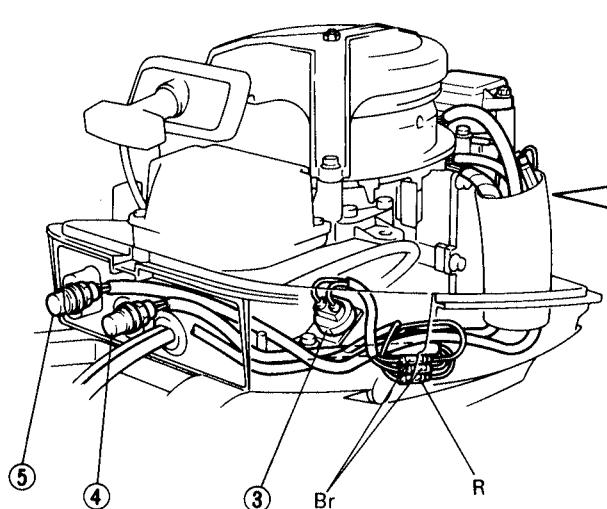


INSP
ADJ

PREDELIVERY SERVICE

6CM	6CEM	✓
8CM	8CEM	✓

- ① C.D.I. unit B : Black
② Ignition coil Br : Brown
③ Neutral switch G : Green
④ Starter switch G/W : Green/White
⑤ Engine stop switch O : Orange
⑥ Battery R : Red
⑦ Starter motor W : White
⑧ Fuse W/R : White/Red
⑨ Starter relay
⑩ Rectifier



INSP

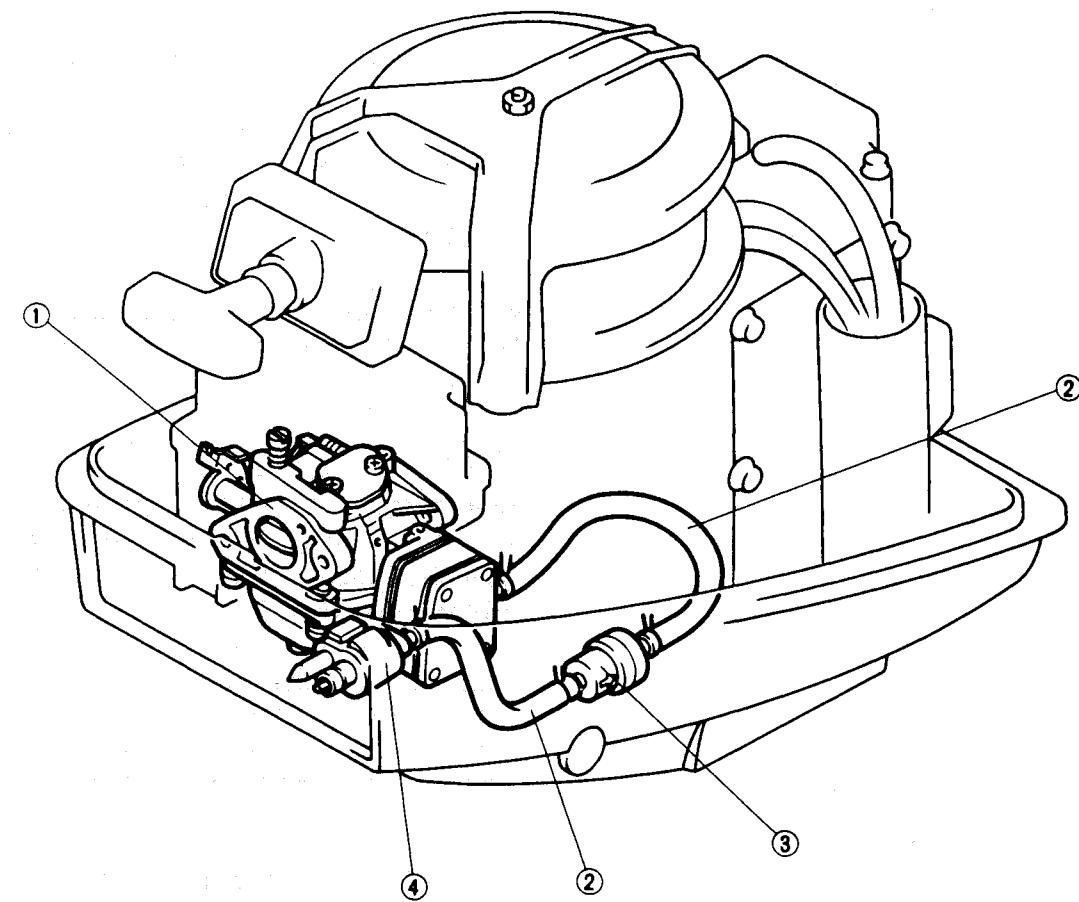
ADJ



PREDELIVERY SERVICE

FUEL LINE

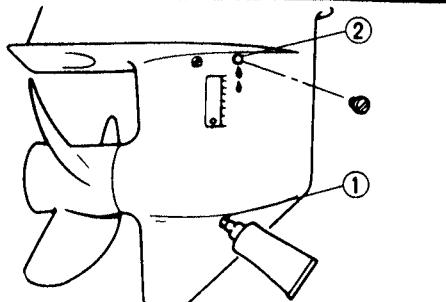
- ① Carburetor
- ② Fuel hose
- ③ Fuel strainer
- ④ Hose joint



INSP
ADJ



PREDELIVERY SERVICE



D23000-0

GEAR OIL LEVEL

Remove the oil-drain ① and oil-level ② plugs, and add the gear oil through the oil-drain hole until it overflows from the oil-level hole. Refit the plugs. (The oil level plug first.)



OPERATION OF CONTROLS AND MOVING PARTS

1. Check shift control for normal operation.
2. Check steering control for smooth operation.
3. Check throttle control for smooth operation.
4. Check ignition timing for normal operation.
5. Check cowling lock and release mechanism for normal operation.
6. Check starting system for normal operation.

CAUTION:

Use a 25:1 fuel mixture to start the engine.

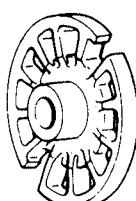
⚠ WARNING

Before attempting to check the starting system, replace the propeller with the specified test propeller, and install the motor in a test tank.



Test propeller:
/90890-01625

7. Check for normal operation of the engine stop system.



INSP



PREDELIVERY SERVICE

D24500-0

FUEL LEAKAGE

Check for fuel leakage.

D25000-0

WATER LEAKAGE

Check for water leakage.

D25500-0

EXHAUST LEAKAGE

Check for exhaust leakage.

D26000-0

ENGINE AND LOWER UNIT NOISE

Check the engine and lower unit for abnormal noise.

D26500-0

IDLE-SPEED

Check that the engine speed at fully-closed throttle is correct.

D27000-0

IGNITION TIMING

Check that the ignition timing at fully-closed and fully-open throttle positions is correct.

D27500-0

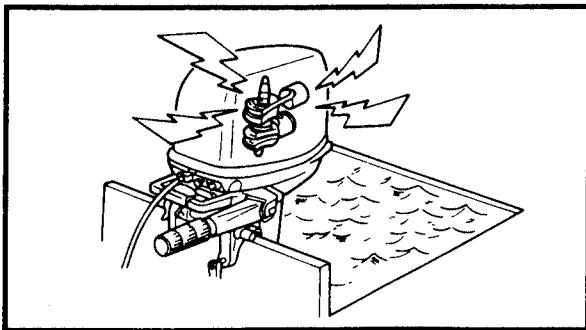
MOTOR EXTERIOR

Check the motor exterior for any flaking of the paint, and if necessary touch-up with paint of the original color.

D28000-1

INSTRUCTING THE NEW OWNER

Instruct the new owner on the operation of all controls and the break-in procedure. Also advise him on propeller-to-boat matching.



**INSP
ADJ****PERIODIC SERVICE**

D30000-0

**PERIODIC SERVICE
MAINTENANCE SCHEDULE**

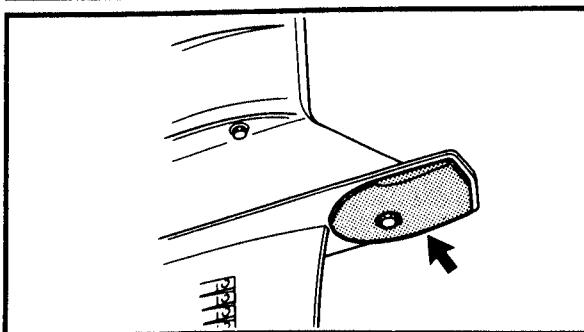
The following chart may be taken as a helpful guide to the intervals between maintenance procedures.

Item	Remarks	Interval			Thereafter every		Refer page
		10 hours (Break-in)	50 hours 3 months	100 hours 6 months	100 hours 6 months	200 hours 12 months	
Anode	Inspection/ Replacement	○	○	○	○		3-8
Battery	Inspection	○					3-9
Bolts and nuts	Retightening	○		○	○		-
Carburetor	Inspection/ Adjustment	○		○	○		-
Cooling water passage	Cleaning		○	○	○		-
Cotter-pin	Inspection/ Replacement		○	○	○		-
Fuel strainer	Inspection/ Replacement				○		3-10
Fuel line	Inspection			○	○		3-10
Fuel tank	Cleaning					○	-
Gear oil	Replacement	○		○	○		3-10
Greasing points	Greasing			○	○		3-17
Idle speed	Adjustment			○	○		3-13
Ignition timing	Inspection/ Adjustment	○		○	○		3-14
Outboard motor body	Inspection		○	○	○		-
Propeller	Inspection/ Retightening		○	○	○		3-8
Spark plug	Cleaning/ Adjustment	○	○	○	○		3-11
Start-in-gear protection	Adjustment	○		○	○		3-13
Throttle link	Adjustment	○		○	○		3-16

INSP
ADJ



PERIODIC SERVICE



ANODE

1. Inspect:

- Anode

Wear/Damage → Replace.

CAUTION:

Do not paint the anode, or the outboard may be corroded.

2. Clean:

- Anode

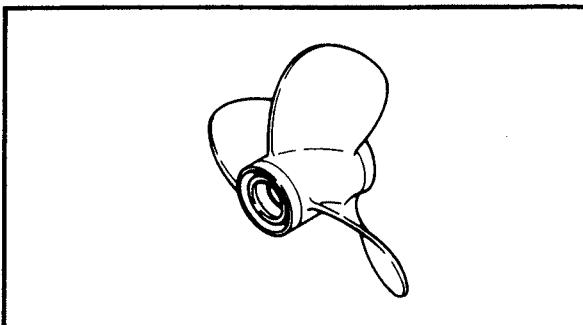
Use a wire brush.

NOTE:

Remove all trace of oil or grease. After cleaning, polish the contact surfaces of the anode mount, and re-install.

CAUTION:

Never paint the anode. To sure good electrical contact, keep the anode contact surface clean of oil or grease.



PROPELLER

1. Inspect:

- Propeller
- Spline

Wear/Cracks/Damage → Replace.

**INSP
ADJ****PERIODIC SERVICE****BATTERY**

6CM		6CEM	✓
8CM		8CEM	✓

⚠ WARNING

Battery electrolyte is poisonous and dangerous, causing severe burns, etc. It contains sulfuric acid. Avoid contact with skin, eyes, or clothing.

Antidote:

EXTERNAL; Flush with water.

INTERNAL; Drink large quantities of water or milk. Follow with milk of magnesia, beaten egg, or vegetable oil. Call physician immediately.

EYES; Flush with water for 15 minutes and get prompt medical attention.

Batteries produce explosive gases: Keep sparks, flame, cigarettes, etc. away. Ventilate when charging or using in a closed space. Always wear eye protection when working near batteries.

KEEP OUT OF REACH OF CHILDREN.

NOTE:

- Batteries vary among manufacturers. Therefore the following procedures may not always apply. Consult your battery manufacturer's instructions.
- Disconnect the black negative lead first to prevent the risk of shorting.

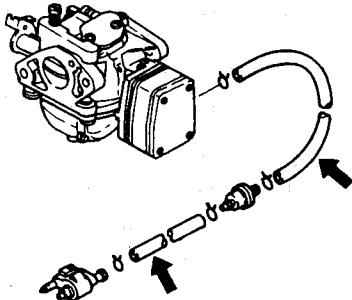
1. Inspect:

- Battery fluid level
- Battery fluid specific gravity

**INSP
ADJ**



PERIODIC SERVICE



FUEL LINE

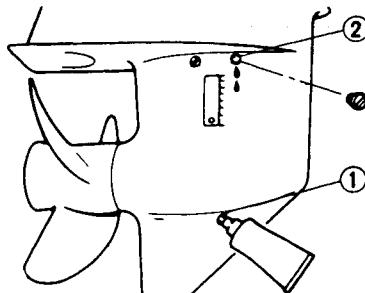
1. Inspect:

- Fuel line

Crack/Leak/Damage → Replace.

FUEL STRAINER

Refer to page 4-2.



GEAR OIL

1. Check:

- Gear oil level

Oil level is low → Add oil to proper level.

Checking steps:

- Place the outboard motor in an upright position.
- Remove the oil-drain ① and oil-level ② plugs.
- Add the gear oil through the oil drain hole until it over flows from the oil level hole.



Recommended oil:
GEAR CASE LUBE (USA) or
Hypoid gear oil (SAE #90)

- Install the oil level plug.
- Install the oil drain plug.

2. Check:

- Gear oil

Dirt → Replace.

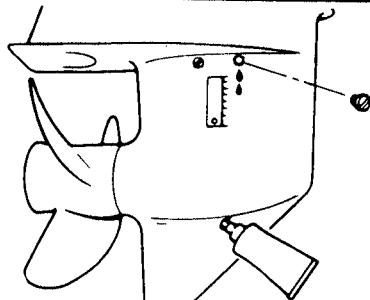
Replacement steps:

- Place the outboard motor in an upright position.
- Place a suitable container under the outboard motor.
- Remove the oil drain and level plugs.
- Drain the gear oil.
- Fill the gear oil.

INSP
ADJ

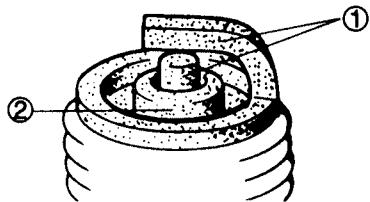


PERIODIC SERVICE



Recommended oil:
GEAR CASE LUBE (USA) or
Hypoid gear oil (SAE #90)
Oil capacity:
160 cm³
(5.41 US oz, 5.63 Imp oz)

- Check the gear oil level.
- Install the oil level plug.
- Install the oil drain plug.



SPARK PLUG

1. Remove:
 - Spark plug
2. Inspect:
 - Electrode ①
Wear/Damage → Replace.
 - Insulator color ②
Normal condition is a medium to light tan color.
Distinctly different color → Check the engine condition.
White color: Lean fuel mixture
 - Plugged filter, jet
 - Air leak
 - Wrong setting
 - Blackish color: Electrical malfunction
 - Defective spark plug
 - Excess oil used
3. Clean:
 - Spark plug
Clean the spark plug with a spark plug cleaner or wire brush.

INSP
ADJ



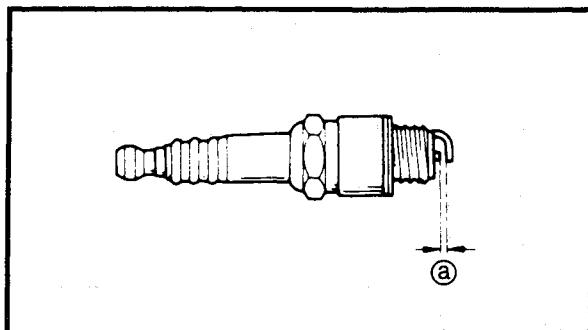
PERIODIC SERVICE

4. Inspect:

- Spark plug type
Incorrect → Replace.



Standard spark plug:
NGK B7HS-10
NGK BR7HS-10
(noise suppressor type)



5. Measure:

- Spark plug gap **a**
Out of specification → Adjust.
Use a wire gauge.



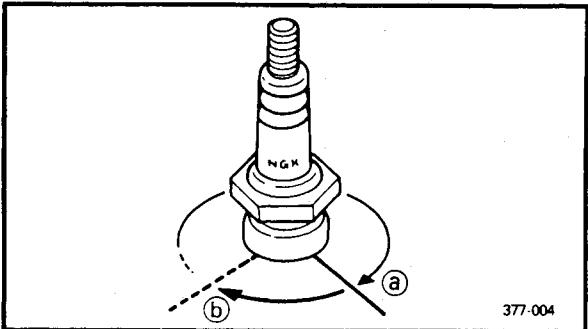
Spark plug gap:
0.9 ~ 1.0 mm (0.035 ~ 0.039 in)

6. Tighten:

- Spark plug

NOTE:

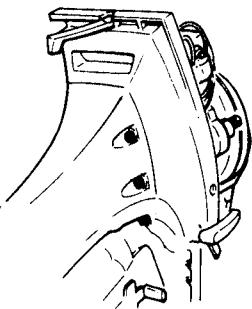
Before installing a spark plug, clean the gasket surface and plug surface. Also it is suggested to apply a thin film of Anti Seize Compound to the spark plug threads to prevent future thread seizure.



Spark plug:
25 Nm (2.5 m · kg, 18 ft · lb)

NOTE:

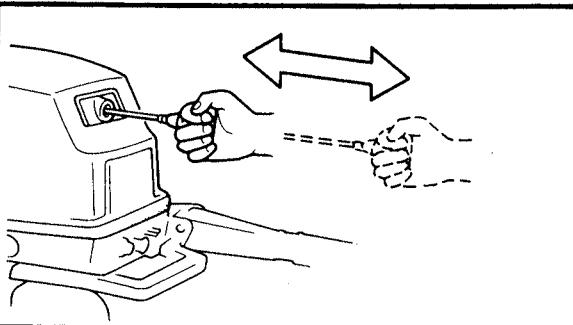
If a torque wrench is not available when you are installing a spark plug, a good estimate of the correct torque is 1/4 to 1/2 turns **b** part finger tight **a**. Have the spark plug torqued to the correct value as soon as possible with a torque wrench.



ENGINE MOUNTING BOLTS AND FLYWHEEL NUT

1. Check:

- Engine mounting bolt
 - Flywheel nut
- Loosen → Tighten.



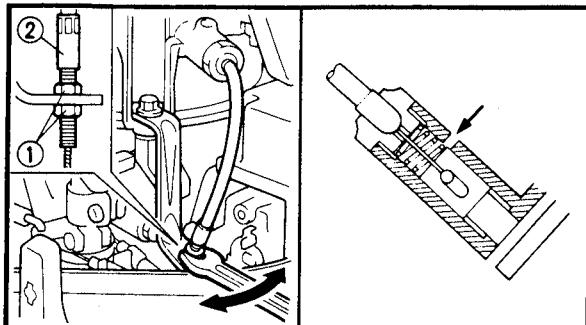
START-IN-GEAR PROTECTION ADJUSTMENT

1. Check:

- Start-in-gear protection operation Incorrect → Adjust.

2. Adjust:

- Start-in-gear protection wire



Adjustment steps:

- Set the shift lever to neutral.
- Loosen the lock nut ①.
- Adjust the start-in-gear protection wire adjust bolt ② so that the end of the starter stop-plunger aligns with the center of the hole in the starter case.
- Tighten the lock nut.

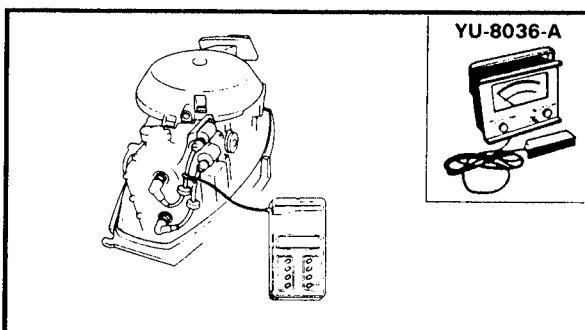
IDLE SPEED ADJUSTMENT

NOTE:

After adjusting the engine idle speed, the throttle control link should be adjusted.

1. Measure:

- Idle speed
- Out of specification → Adjust.

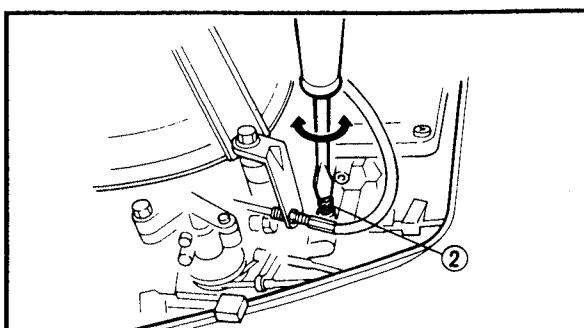
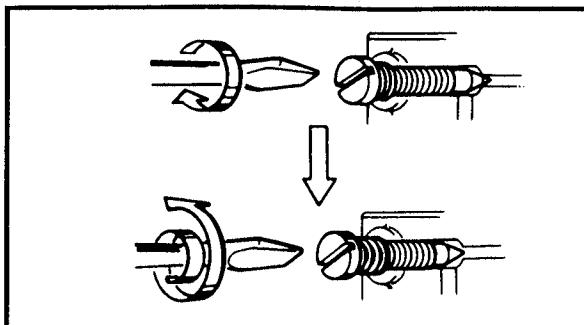
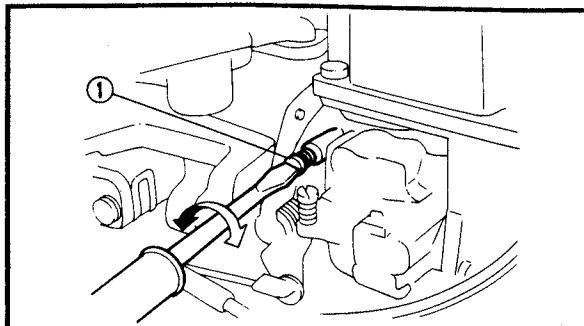


	Idle speed: $900 \pm 50 \text{ rpm}$
--	--

Measuring steps:

- Start the engine and let it warm up.
- Attach the tachometer to spark plug lead.

	Tachometer: YU-8036-A/90890-06760
--	---

**2. Adjust:**

- Idle speed

Adjustment steps:

- Turn the pilot screw ① until it is lightly seated.
- Turn the pilot screw outward to specification.

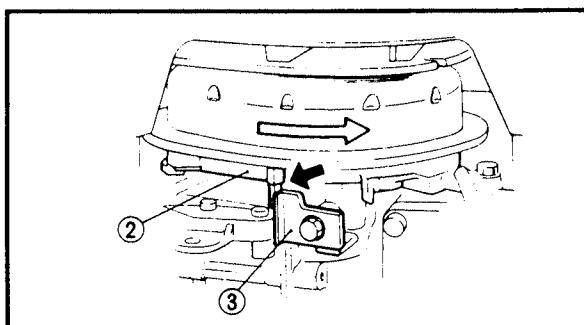
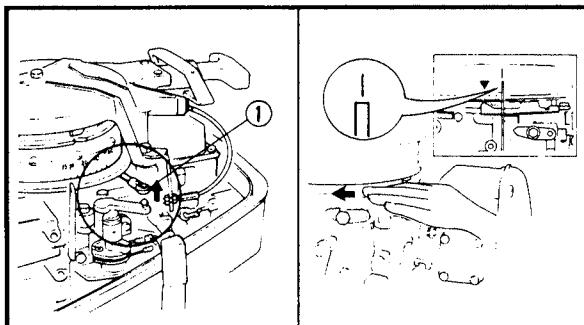


Pilot screw:
 $1\frac{1}{8} \pm 1\frac{1}{4}$ turns out

- Start the engine, and allow it to warm up for a few minutes.
- Turn the throttle stop screw ② in or out until specified idle speed is obtained.

Turning in → Idle speed becomes higher.

Turning out → Idle speed becomes lower.

**IGNITION TIMING ADJUSTMENT****1. Check:**

- Ignition timing (at full advanced)
Incorrect → Adjust.

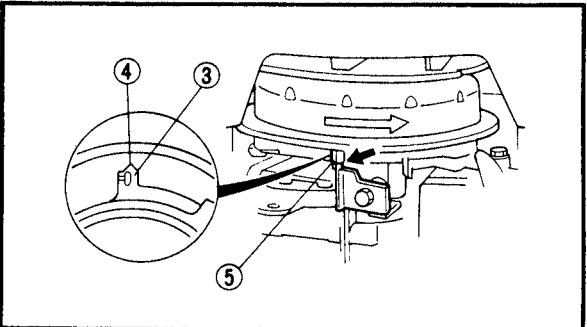
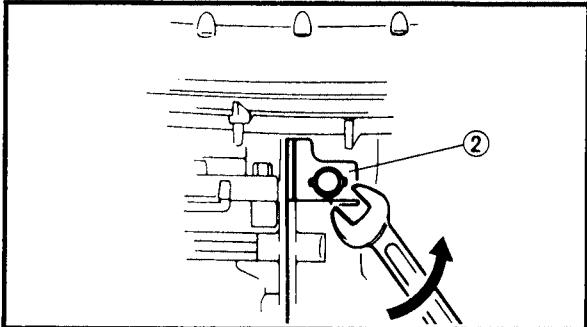
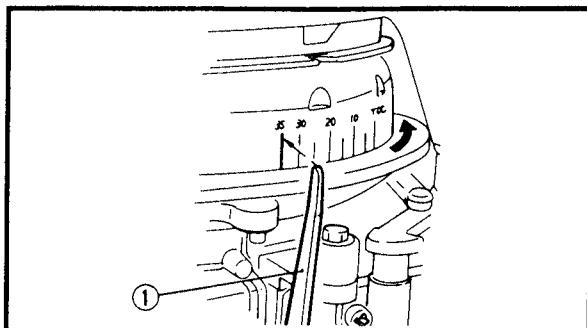
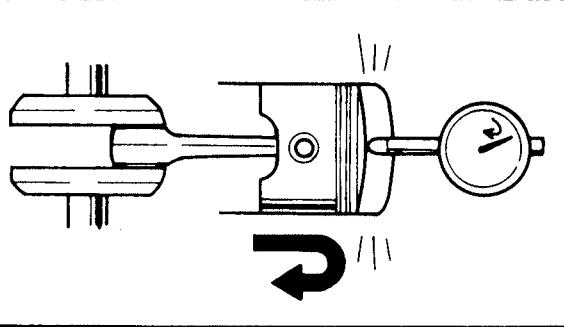
Checking steps:

- Disconnect the joint link ①.
- Slowly turn the flywheel clockwise.
- Align the timing plate with specification on the flywheel indicator.



Ignition timing (at full advanced):
B.T.D.C. $35 \pm 1^\circ$

- Align the marks on the magneto base and flywheel by turning the magneto base.
- Check the magneto base ② to contact the stopper plate ③.



2. Adjust:

- Ignition timing (at full advanced)

Adjustment steps:

- Remove the spark plugs.
- Attach the dial gauge in the spark plug hole of No. 1 (upper) cylinder.

**Dial gauge:**

YU-3097/90890-01252

Dial gauge stand:

YU-1256

- Slowly turn the flywheel clockwise, and stop it when the piston is at TDC.

CAUTION:

Be sure to turn the flywheel clockwise, or the impeller blade will be twisted the other way, thus reducing pump performance.

- Set the timing plate at TDC.
- Turn the flywheel to align the timing plate ① with specification on the flywheel indicator.



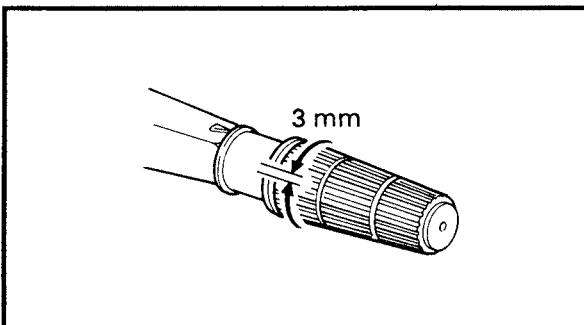
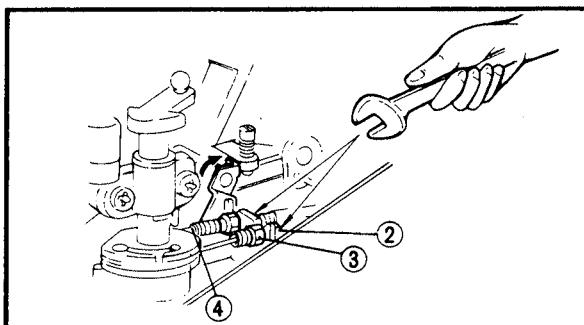
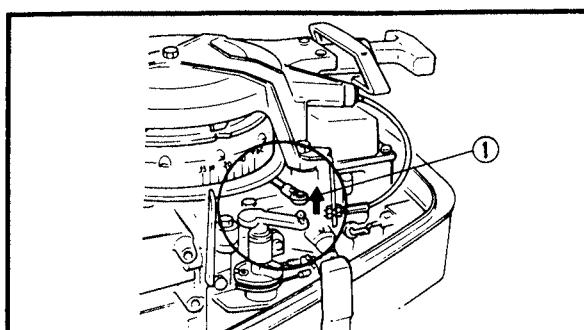
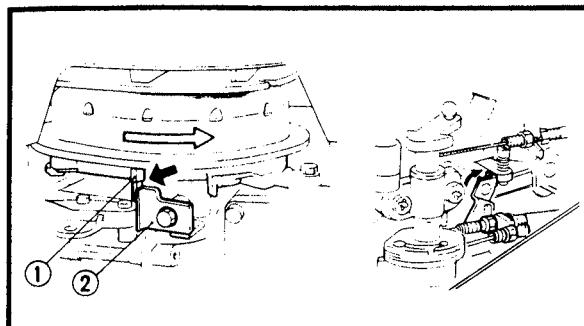
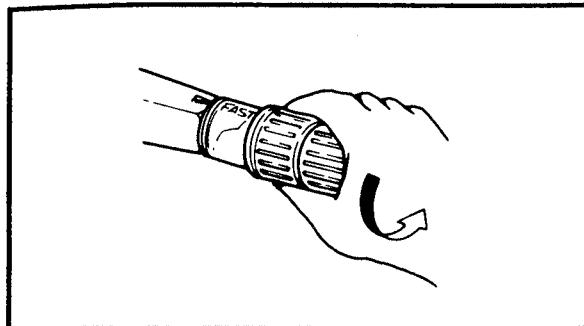
**Ignition timing (at full advanced):
B.T.D.C. $35 \pm 1^\circ$**

- Loosen the stopper plate set-bolt ②.
- Align the marks on the magneto base ③ and flywheel ④ by turning the magneto base.
- Adjust the stopper plate so that it contacts with the magneto base stopper ⑤.

NOTE:

Press the stopper plate against the full-advanced side of the magneto base.

- Tighten the stopper plate set-bolt.
- Connect the joint link.



THROTTLE CONTROL LINK ADJUSTMENT

NOTE:

Before adjusting the throttle control link, the ignition timing should be adjusted.

1. Check:

- Full-open position
Incorrect → Adjust.

Checking steps:

- Set the shift lever to forward position.
- Fully open the throttle grip.
- Check the magneto base stopper ① so that it contacts with the stopper plate ②.
- Check the throttle valve in full-opened.

2. Adjust:

- Throttle control link

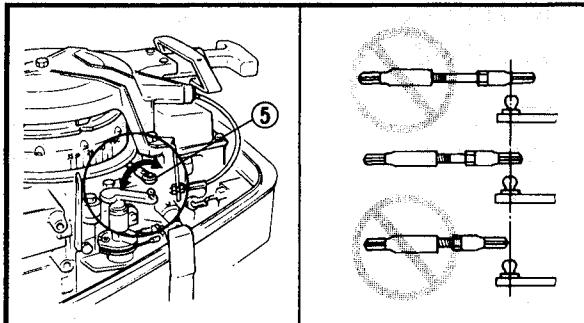
Adjustment steps:

- Remove the joint link ①.
- Set the shift lever to forward position.
- Bring the stopper on the full-advanced side of the magneto base to contact the magneto base stopper.
- Fully open the throttle grip.
- Adjust the cable adjuster on the "pull" throttle cable ② until to fully-open the carburetor throttle valve.
- Tighten the lock nut ③ on the "pull" throttle cable.
- Adjust the cable adjuster on the "push" throttle cable ④ until there is 3 mm (0.12 in) free play on the throttle grip.
- Tighten the lock nut.

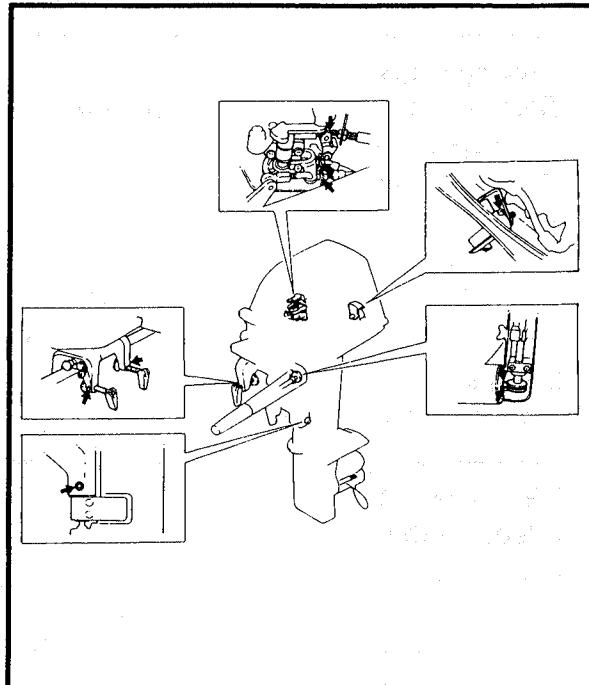
INSP



PERIODIC SERVICE



- Adjust the length of the joint link ⑤ so that the control lever comes to contact with the magneto base.
- Connect the joint link.
- Check the throttle valve to fully open position.



GREASING POINTS

1. Apply:
 - Water resistant grease



CHAPTER 4

FUEL SYSTEM

FUEL SYSTEM	4-1
PREPARATION FOR REMOVAL	4-1
INSPECTION	4-2
Fuel joint.....	4-2
Fuel strainer	4-2
ASSEMBLY AND INSTALLATION.....	4-2
Fuel strainer	4-2
Fuel joint.....	4-3
 CARBURETOR.....	 4-4
PREPARATION FOR REMOVAL	4-4
NOTE ON REMOVAL AND REASSEMBLY	4-5
REMOVAL POINTS.....	4-5
Float.....	4-5
INSPECTION	4-6
Carburetor body	4-6
Pilot screw.....	4-6
Jet and nozzle	4-6
Needle valve	4-6
Float.....	4-6
ASSEMBLY AND INSTALLATION.....	4-7
Fuel pump	4-7
Carburetor	4-7

FUEL**FUEL SYSTEM**

E20050-0

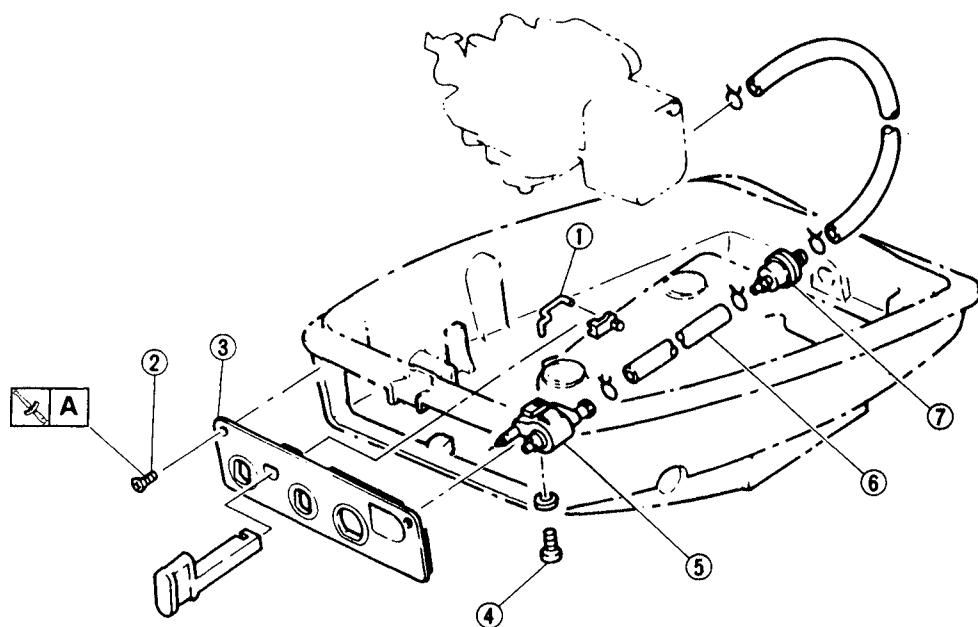
FUEL SYSTEM**PREPARATION FOR REMOVAL**

- Remove the top cowling.

WARNING

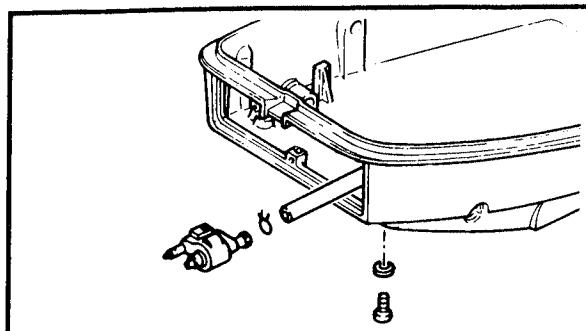
- Petrol (gasoline) is highly inflammable and explosive. Handle with special care.
- Failure to check for fuel leakage may result in fire or explosion.

A	3 Nm (0.3 m · kg, 2.2 ft · lb)
---	--------------------------------



Extent of removal: ① Front panel removal ② Fuel joint removal
 ③ Fuel strainer removal

Extent of removal	Order	Part name	Q'ty	Remarks
↑ ① ↓ ② ↓ ③ ↓	1	Choke joint	1	Disconnect the joint at carburetor side.
	2	Screw	3	
	3	Front panel	1	
	4	Bolt	1	
	5	Fuel joint	1	Disconnect the fuel hose.
	6	Fuel hose	1	
	7	Fuel strainer	1	



E21850-0

INSPECTION

Fuel joint

1. Inspect:

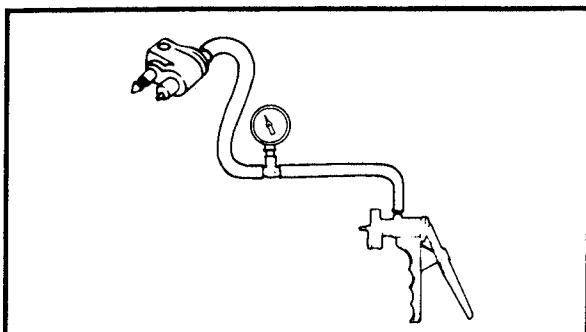
- Fuel joint

Crack/Leak/Damage → Replace.

2. Measure:

- Fuel joint operation

Impossible to maintain the specified pressure for 10 sec. → Replace.



Measuring steps:

- Attach the Mity vac.

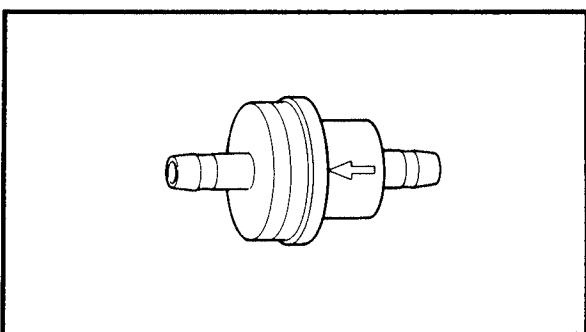


Mity vac:
YB-35956/90890-06756

- Apply the specified pressure.



Specified pressure:
50 kPa (0.5 kg/cm², 7.1 psi)

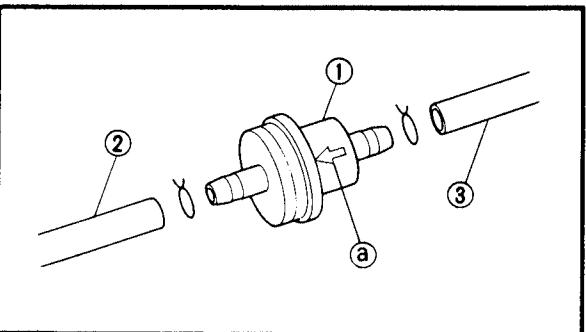


Fuel strainer

1. Inspect:

- Fuel strainer

Crack/Leak/Clog → Replace.



E22050-0

ASSEMBLY AND INSTALLATION

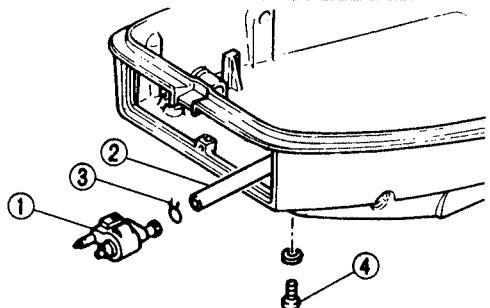
Fuel strainer

1. Install:

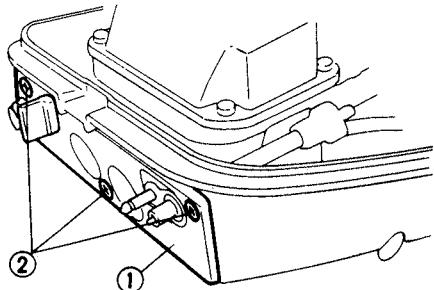
- Fuel strainer ①
- Fuel hose ② (to carburetor)
- Fuel hose ③ (from fuel joint)

NOTE: _____

The direction mark ④ should be installed facing to the carburetor.

FUEL**FUEL SYSTEM****Fuel joint****1. Install:**

- Fuel joint ①
- Fuel hose ② (to fuel filter)
- Clip ③
- Bolt ④

**2. Install:**

- Front panel ①
- Screw ②

	Screw: 3 Nm (0.3 m · kg, 2.2 ft · lb)
--	--

3. Connect:

- Choke joint

NOTE:

After installing, check the smooth movement of the choke knob.

4. Check:

- Fuel line
- Leak → Repair.



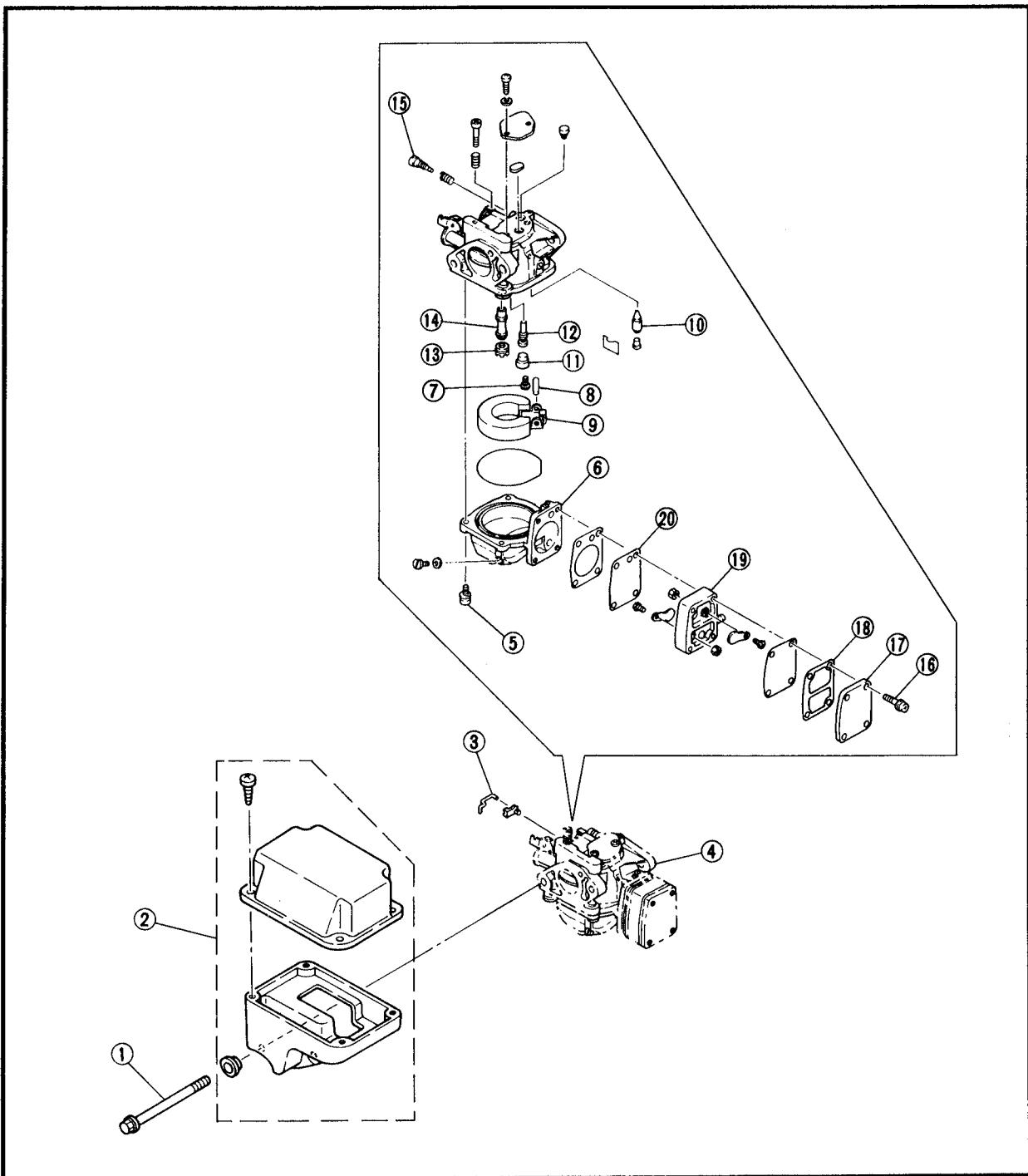
E20050-0

CARBURETOR**PREPARATION FOR REMOVAL**

- Remove the top cowling.
- Remove the front panel.

WARNING

- Petrol (gasoline) is highly inflammable and explosive. Handle with special care.
- Failure to check for fuel leakage may result in fire or explosion.



FUEL**CARBURETOR**

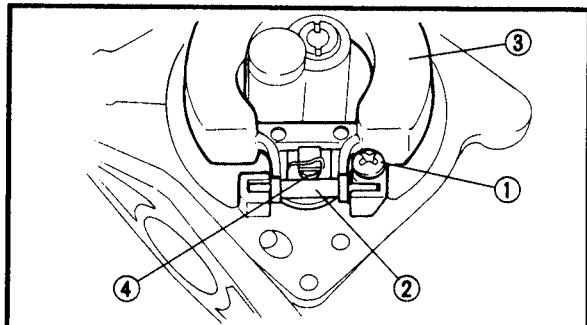
E31150-0

NOTE ON REMOVAL AND REASSEMBLY

- With the engine mounted, the following parts can be removed.
- Before inspection, the removed parts should be cleaned and blow out all passages and jets with compressed air.
- After removing the carburetor, cover the carburetor joint not to enter foreign material.

Extent of removal: ① Carburetor removal ② Carburetor disassembly
 ③ Fuel pump disassembly

Extent of removal	Order	Part name	Q'ty	Remarks
↑ ① ↓ ↓ ② ↑ ③ ↓	1	Bolt	2	
	2	Intake silencer	1	
	3	Choke rod	1	
	4	Carburetor	1	
	5	Screw	4	
	6	Float chamber body	1	
	7	Screw	1	
	8	Float pin	1	
	9	Float	1	Refer to REMOVAL POINTS.
	10	Needle valve	1	
↑ ③ ↓	11	Cap	1	
	12	Pilot jet	1	
	13	Main jet	1	
	14	Main nozzle	1	
	15	Pilot screw	1	
↑ ③ ↓	16	Screw	4	
	17	Body (outer)	1	
	18	Diaphragm	1	
	19	Body (inner)	1	
	20	Diaphragm	1	

**REMOVAL POINTS****Float**

1. Remove:

- Screw ①
- Float pin ②
- Float ③
- Needle valve ④

NOTE: _____

The needle valve is removed together with the float.

FUEL**CARBURETOR**

E32050-0

INSPECTION**Carburetor body**

1. Inspect:

- Carburetor body
Crack/Damage → Replace.
Contamination → Clean.

NOTE:

- Use a petroleum based solvent for cleaning. Blow out all passages with compressed air.

- Do not use a wire.

E32052-0

Pilot screw

1. Inspect:

- Pilot screw
Bend/Wear → Replace.

E32054-0

Jet and nozzle

1. Inspect:

- Main jet
- Pilot jet
- Main nozzle
Contamination → Replace.

E32056-0

Needle valve

1. Inspect:

- Needle valve
Grooved wear → Replace.

E32058-0

Float

1. Inspect:

- Float
Crack/Damage → Replace.



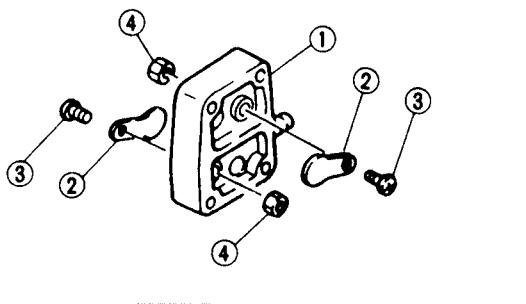
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ASSEMBLY AND INSTALLATION

Fuel pump

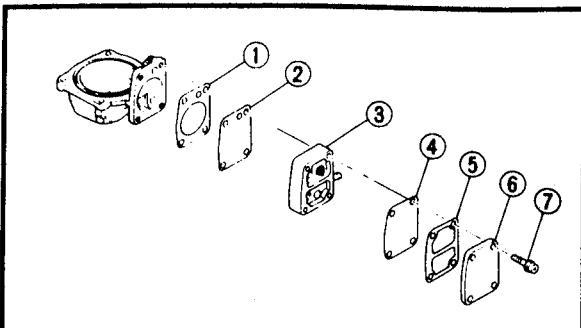
1. Install:

- Body ① (inner)
- Check valve ②
- Screw ③
- Nut ④



2. Install:

- Gasket ①
- Diaphragm ②
- Body ③ (inner)
- Gasket ④
- Diaphragm ⑤
- Body ⑥ (outer)
- Screw ⑦



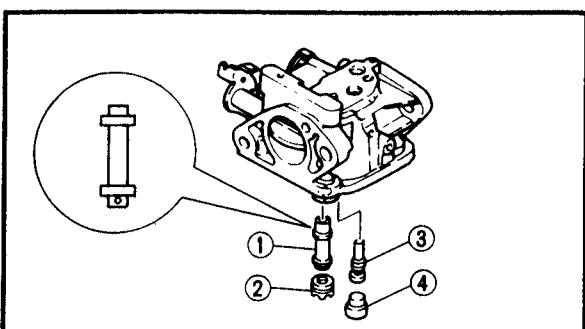
Carburetor

1. Install:

- Main nozzle ①
- Main jet ②
- Pilot jet ③
- Cap ④

NOTE:

Install the main nozzle by holding its end with a hole.

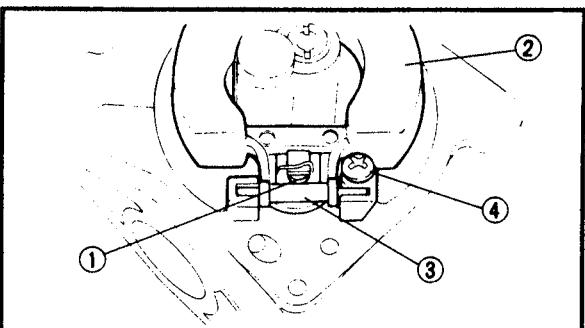


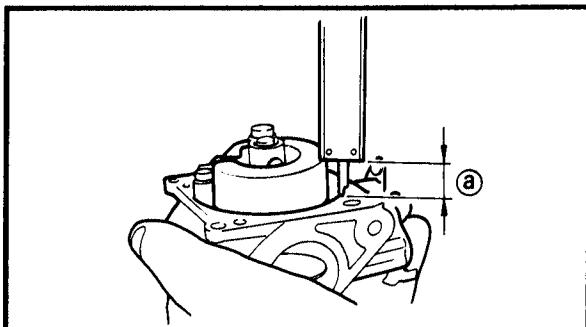
2. Install:

- Needle valve ①
- Float ②
- Float pin ③
- Screw ④

NOTE:

- The float pin should be fit in the slit the carburetor and locked with the screw.
- When installing the float in the carburetor, place the needle valve in the valve seat.
- After installing, check for smooth movement the float.



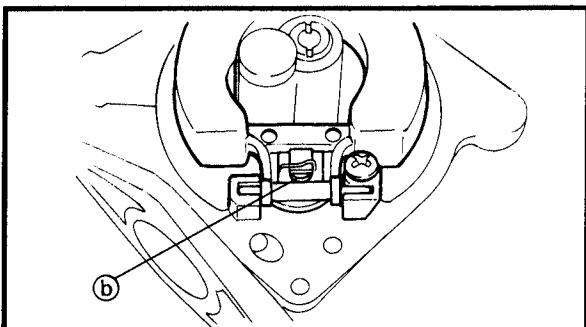
FUEL**CARBURETOR****3. Measure:**

- **Float height ④**

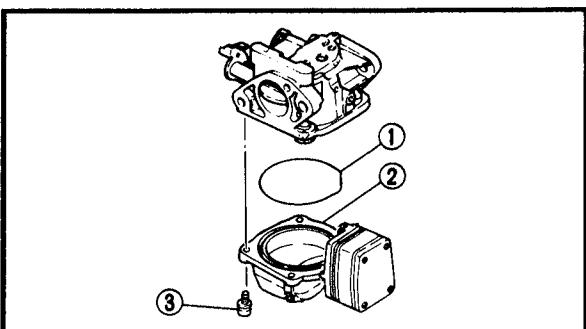
Out of specification → Fold the tab ⑤
to adjust float arm height.

**Float height:**

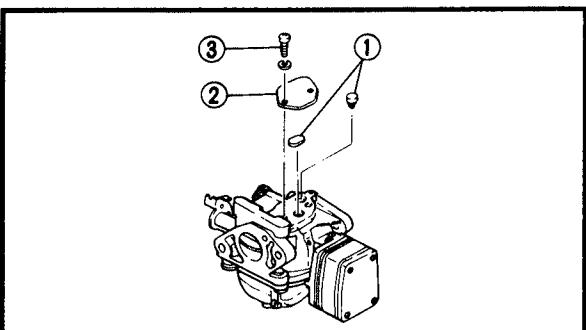
$14 \pm 2 \text{ mm (} 0.55 \pm 0.08 \text{ in)}$

**NOTE:** _____

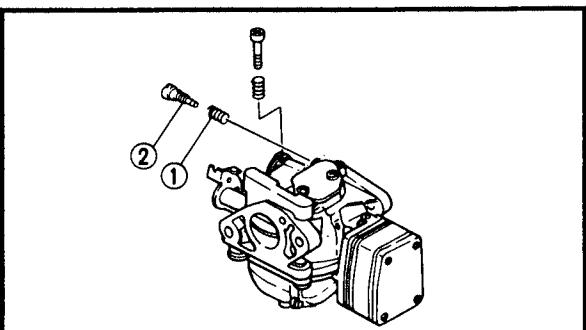
- The float should be resting on the needle valve, but not compressing the needle valve.
- Take measurement at the end surface of the float opposite to its pivot side.

**4. Install:**

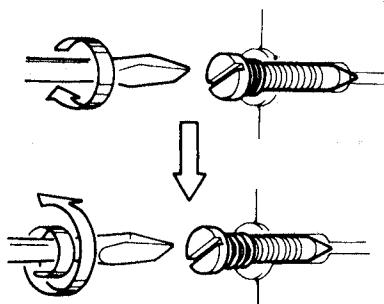
- O-ring ① (float chamber)
- Float chamber body ②
- Screw ③

**5. Install:**

- Gasket ① (mixing cover)
- Mixing cover ②
- Screw ③

**6. Install:**

- Spring ①
- Pilot screw ②

FUEL**CARBURETOR****7. Adjust:**

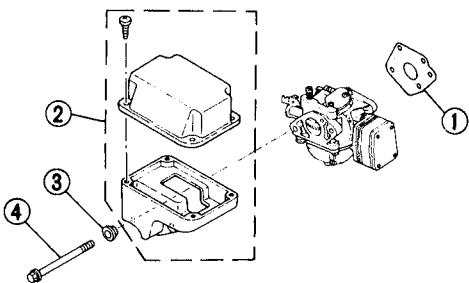
- Pilot screw

Adjustment steps:

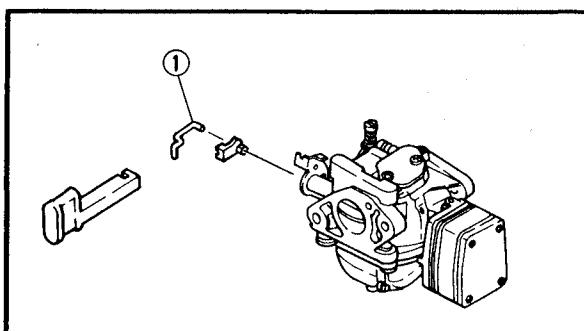
- Screw in the pilot screw until it is lightly seated.
- Back out by the specified number of turns.

**Pilot screw:**

$1\frac{1}{8} \pm \frac{1}{4}$ (turns out)

**8. Install:**

- Gasket ①
- Intake silencer ②
- Collar ③
- Bolt ④

**9. Install:**

- Throttle link ①
- Fuel hose

10. Adjust:

- Idle speed

Refer to page 3-13 ~ 3-14.



CHAPTER 5

POWER UNIT

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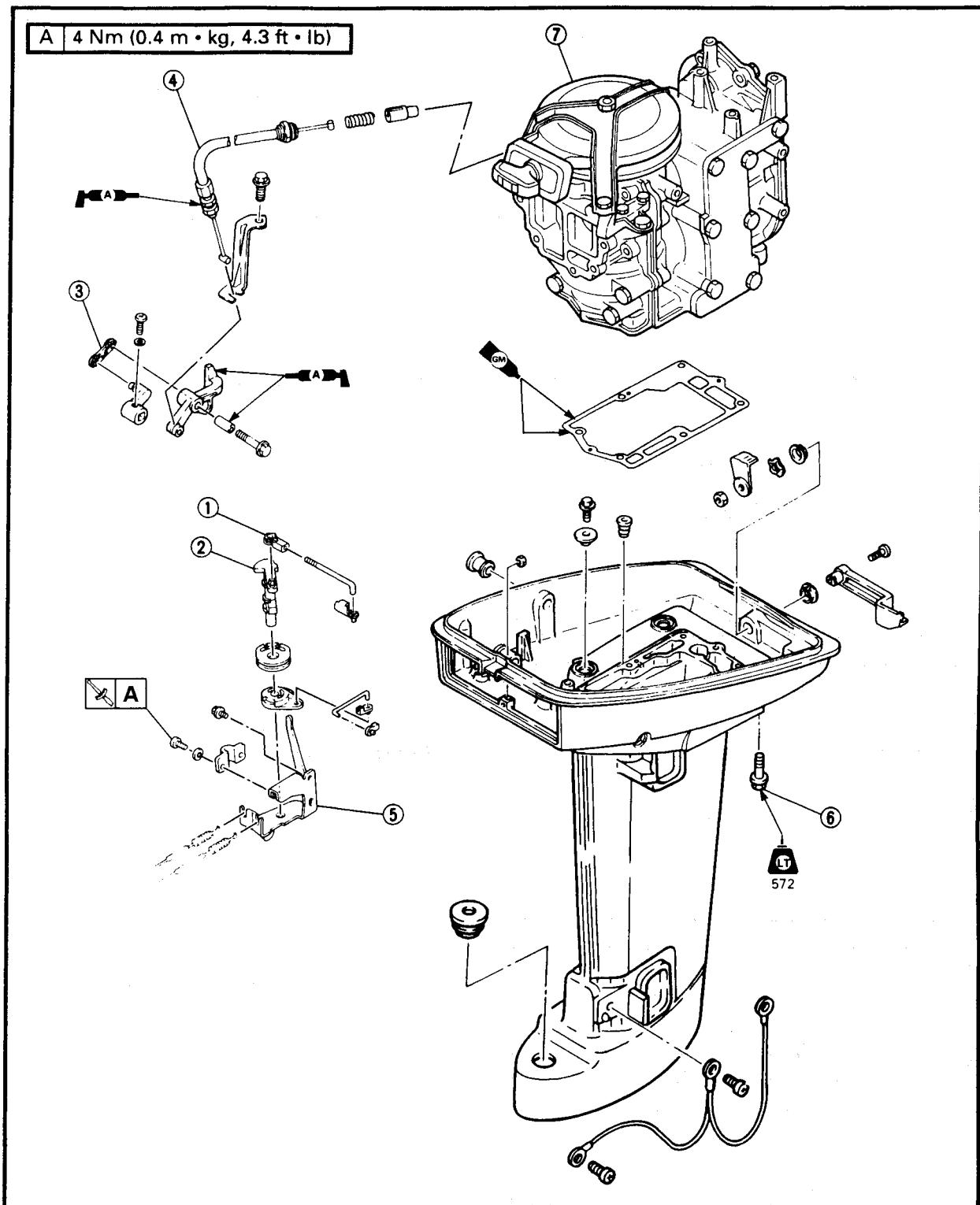


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POWER UNIT REMOVAL AND INSTALLATION

PREPARATION FOR REMOVAL

- Remove the top cowling.
- Remove the carburetor.
- Disconnect the wire leads.
- Disconnect the throttle cables at the lever side.



POWR

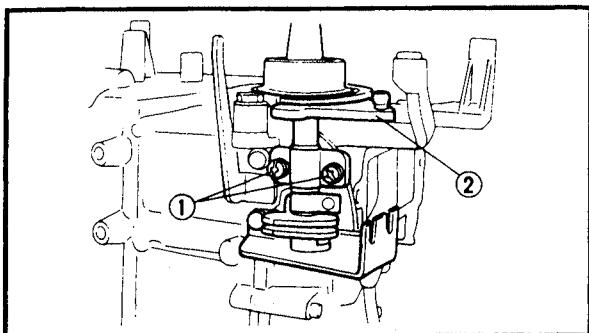
POWER UNIT REMOVAL AND INSTALLATION

NOTE ON REMOVAL AND REASSEMBLY

- Before servicing, clean the power unit.
- Remove any gasket adhered to the contacting surface.

Extent of removal: ① Power unit removal

Extent of removal	Order	Part name	Q'ty	Remarks
①	1	Magneto control rod	1	Refer to "REMOVAL POINTS".
	2	Magneto control lever	1	
	3	Arm rod	1	
	4	Start-in-gear protection wire	1	
	5	Throttle wire stay	1	
	6	Bolt	6	
	7	Power unit	1	

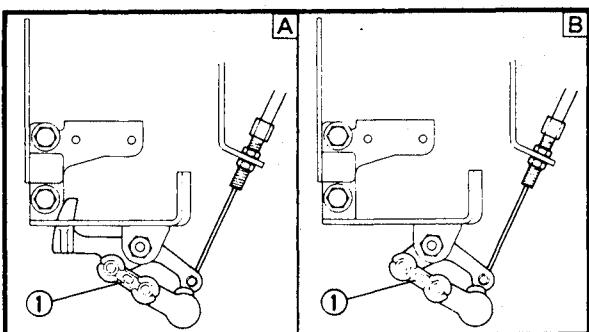


REMOVAL POINTS

Power unit

1. Remove:

- Magneto control rod
- Screw ①
- Magneto control lever ②

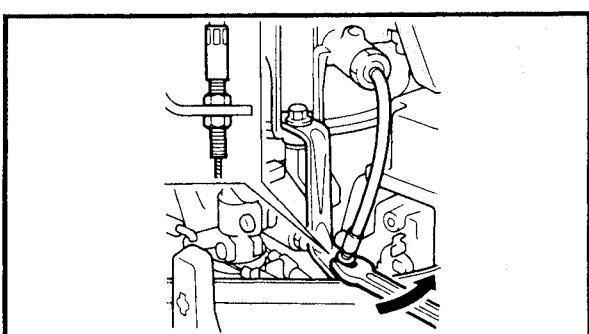


2. Remove:

- Arm rod ①

A: Except for Europe model

B: For Europe model

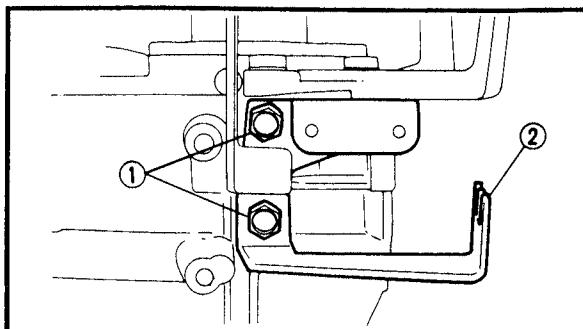


3. Remove:

- Start-in-gear protection wire

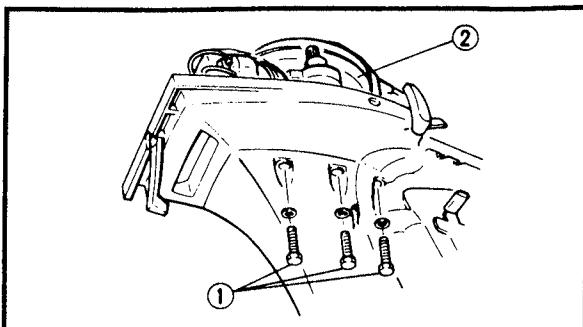
POWR

POWER UNIT REMOVAL AND INSTALLATION



4. Remove:

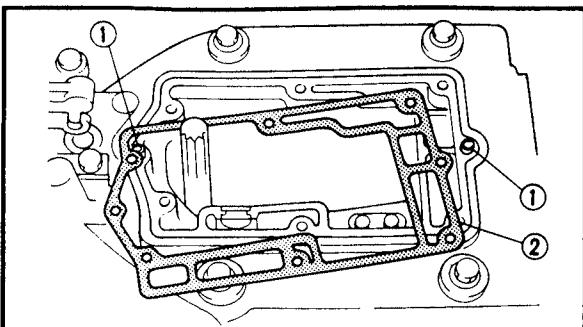
- Bolt ①
- Throttle wire stay ②



5. Remove:

- Bolt ①
- Power unit ②

By shaking the power unit lightly, lift it off.



ASSEMBLY AND INSTALLATION

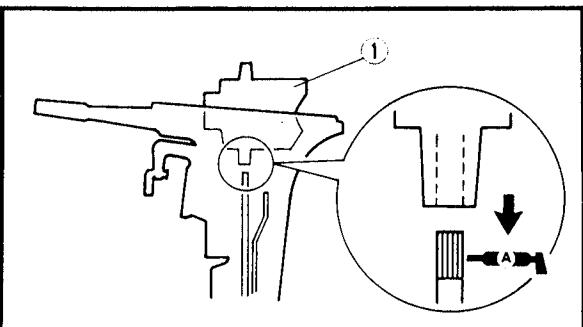
Power unit

1. Install:

- Dowel pin ①
- Gasket ②

NOTE: _____

- Always use the new gasket.
- Clean the contacting surfaces of crank-case and bottom cowling.



2. Install:

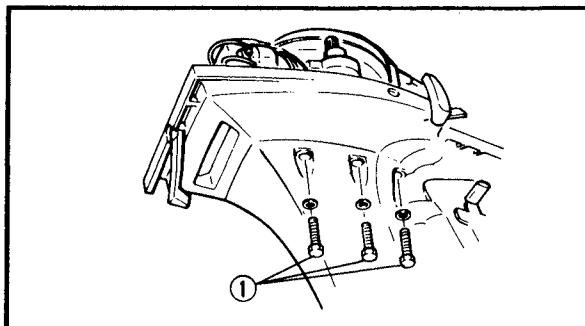
- Power unit ①

NOTE: _____

Insert the drive shaft into the crankshaft. If the splines will not come in complete mesh, rotate the flywheel a little so that they are in mesh correctly.

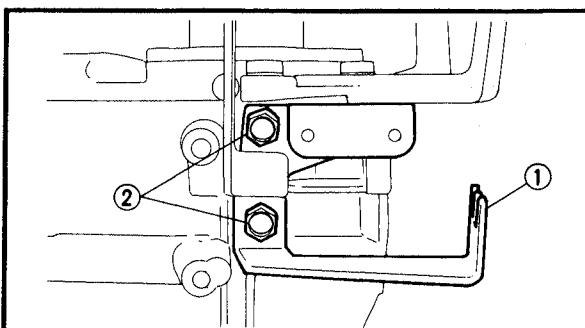
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POWER UNIT REMOVAL AND INSTALLATION



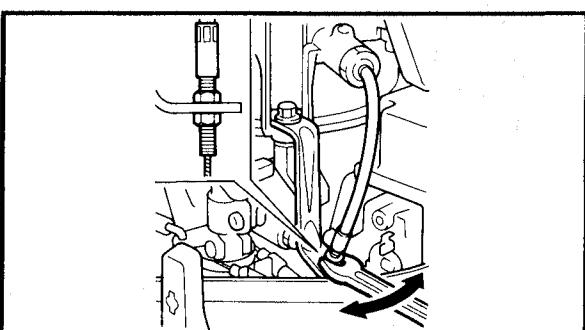
3. Install:

- Bolt ①



4. Install:

- Throttle wire stay ①
- Bolt ②

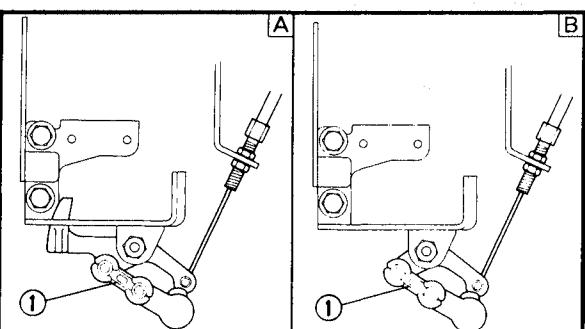


5. Install:

- Start-in-gear protection wire

6. Check:

- Start-in-gear protection operation
Incollect → Adjust.
Refer to page 3-13.

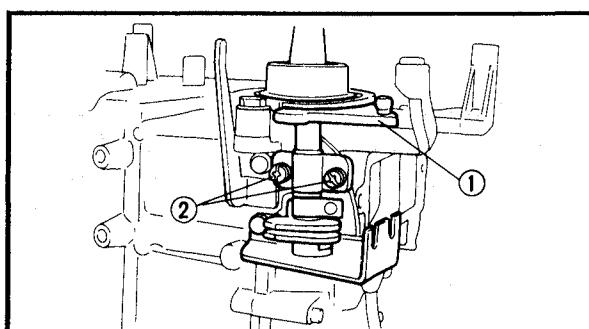


7. Install:

- Arm rod ①

A: Except for Europe model

B: For Europe model



8. Install:

- Magneto control lever ①
- Screw ②
- Magneto control rod

NOTE: _____

Face the arrow mark "↑" upward.

POWR

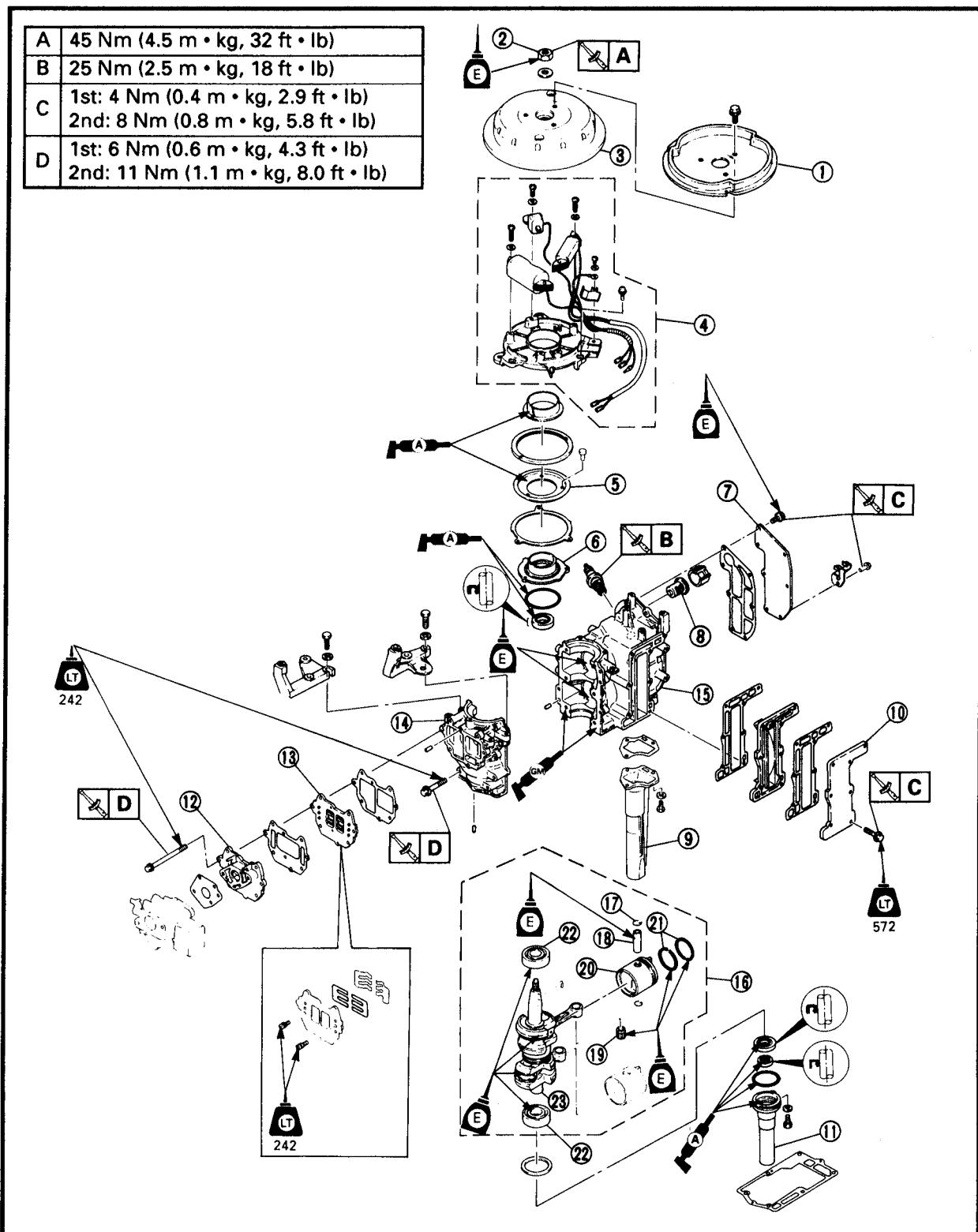
CYLINDER, PISTON AND CRANKSHAFT

CYLINDER, PISTON AND CRANKSHAFT

PREPARATION FOR REMOVAL

- Remove the power unit.
- Remove the starter assembly.

A	45 Nm (4.5 m · kg, 32 ft · lb)
B	25 Nm (2.5 m · kg, 18 ft · lb)
C	1st: 4 Nm (0.4 m · kg, 2.9 ft · lb) 2nd: 8 Nm (0.8 m · kg, 5.8 ft · lb)
D	1st: 6 Nm (0.6 m · kg, 4.3 ft · lb) 2nd: 11 Nm (1.1 m · kg, 8.0 ft · lb)



POWR



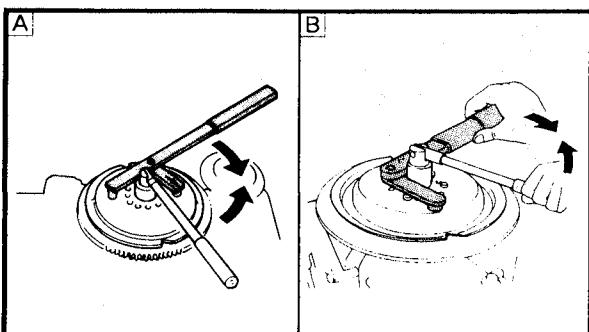
CYLINDER, PISTON AND CRANKSHAFT

NOTE ON REMOVAL AND REASSEMBLY

- Before servicing, clean the power unit.
- Note the piston and connecting rod for cylinder #1 and #2, their should be reset in the originally.
- Remove any gasket adhered to the contacting surface.
- Take care not to scratch the contacting surfaces when removing the cylinder and cylinder head.
- For reassembly, the removed parts should be cleaned with solvent, and apply the engine oil to the sliding surfaces.

Extent of removal: ① Thermostat removal ② Reed valve removal
 ③ Cylinder body disassembly ④ Crankshaft bearing removal

Extent of removal	Order	Part name	Q'ty	Remarks	
	1	Starter pulley	1		
	2	Nut	1		
	3	Flywheel magneto	1	Refer to "REMOVAL POINTS".	
	4	Stator assembly	1		
	5	Magneto base retainer	1		
	6	Oil seal housing	1		
	7	Cylinder head cover	1		
	8	Thermostat	1		
	9	Exhaust manifold	1		
	10	Exhaust cover	1		
	11	Oil seal housing	1		
	12	Intake manifold	1		
	13	Reed valve assembly	1		
	14	Crankcase	1		
	15	Cylinder body	1	Refer to "REMOVAL POINTS".	
	16	Crankshaft and piston	1		
	17	Piston pin clip	4		
	18	Piston pin	3	Refer to "REMOVAL POINTS".	
	19	Small end needle bearing	2		
	20	Piston	2		
21	Piston ring	4	Refer to "REMOVAL POINTS".		
22	Crankshaft bearing	2			
23	Crankshaft assembly	1			



REMOVAL POINTS

Flywheel magneto

1. Remove:

- Nut ①



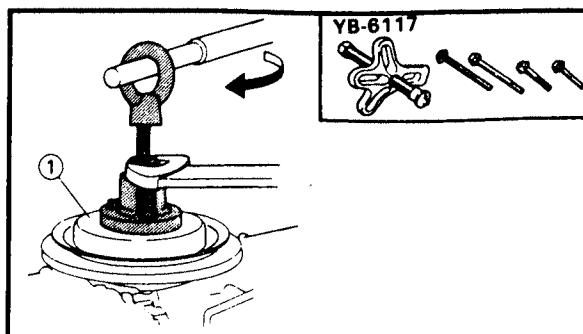
Flywheel holder:
YB-6139/90890-06522

A For USA and CANADA

B Except for USA and CANADA

POWR

CYLINDER, PISTON AND CRANKSHAFT

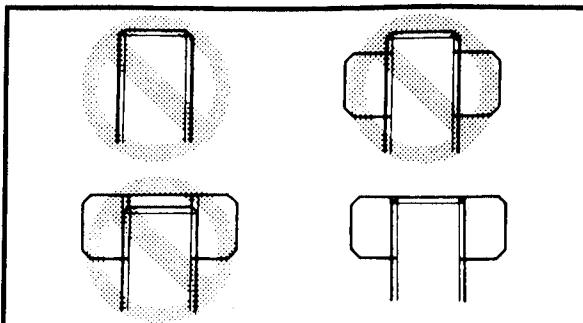


2. Remove:

- Flywheel magneto ①

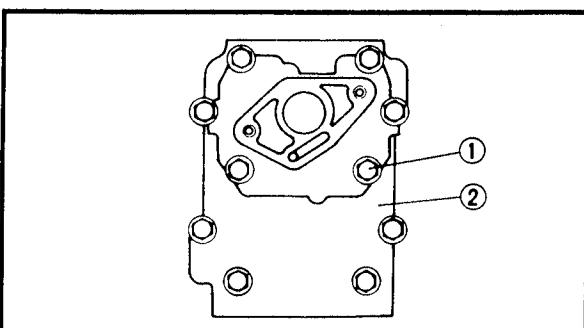
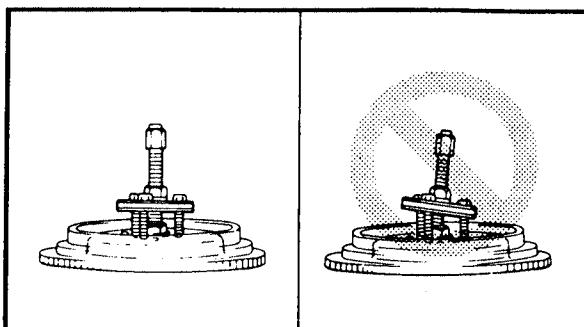


Flywheel puller:
YB-6117/90890-06521



CAUTION:

- Keep the nut side flush with the crankshaft end until the flywheel comes off the tapered portion of the crankshaft.
- 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.



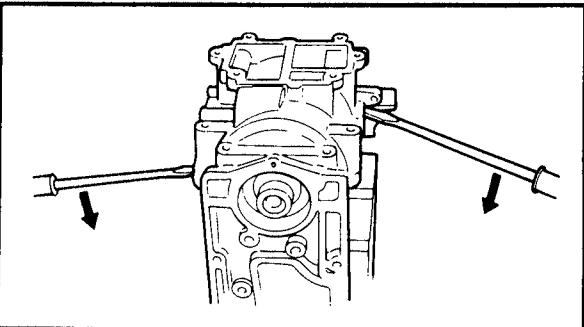
Crankcase

1. Remove:

- Bolt ①
- Crankcase ②

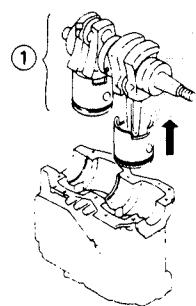
NOTE:

Insert a flat-head screwdriver between the tabs on both the right and left sides of the crankcase and cylinder and pry the two apart.



CAUTION:

Do not scratch the fitting surface of the crankcase.

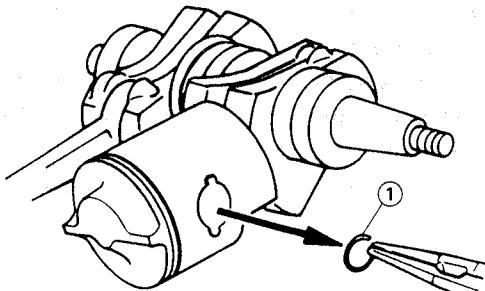
**Crankshaft and piston**

1. Remove:

- Crankshaft and piston ①

NOTE:

Remove the crankshaft by lightly tapping it with a plastic hammer.

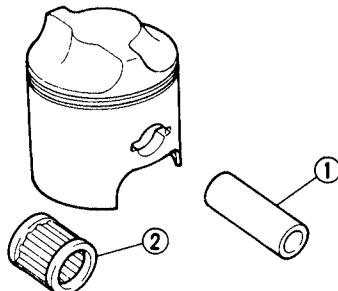
**Piston pin clip**

1. Remove:

- Piston pin clip ①

CAUTION:

Do not damage piston pin hole edge.

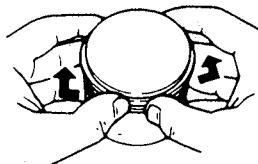
**Piston pin and small end bearing**

1. Remove:

- Piston pin clip ①
- Small end needle bearing ②

NOTE:

When the piston pins, pistons, and small end needle bearings are reused, they should be marked with No. 1 and 2 so that they are not confused.

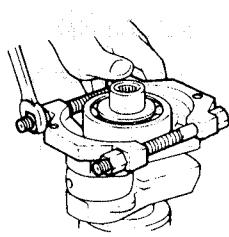
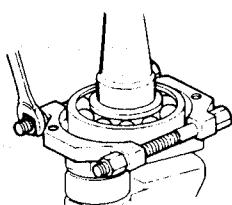
**Piston ring**

1. Remove:

- Piston ring

CAUTION:

Remove the piston ring from the piston by opening the ring to the least possible width.

**Bearing**

1. Remove:

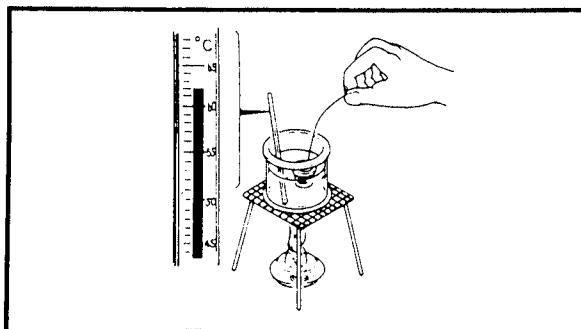
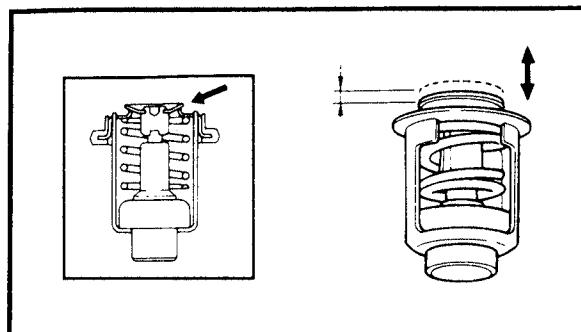
- Bearing

NOTE:

Hold the bearing with the bearing separator, and force out the crankshaft with a press.

**Bearing separator:**

YB-6219/90890-06534

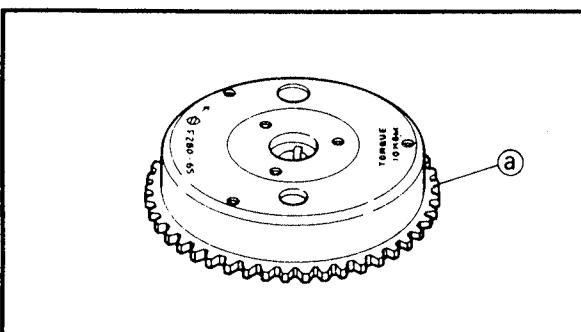
POWR**CYLINDER, PISTON AND CRANKSHAFT****INSPECTION AND REPAIR****Thermostat**

1. Inspect:
 - Thermostat
Stick/Damage → Replace.
2. Measure:
 - Valve opening temperature
 - Valve lift
Out of specification → Replace.

	Water temperature	Valve lift
	Below 48 ~ 52 °C (118 ~ 126 °F)	0 mm (0 in)
	Above 60 °C (140 °F)	Min. 3 mm (0.12 in)

Measurement steps:

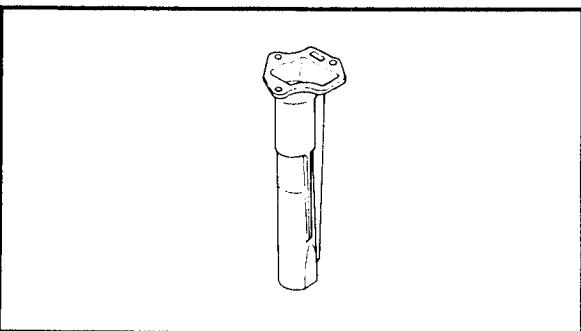
- Suspend thermostat in a vessel.
- Place reliable thermometer in a water.
- Heat water slowly.
- Observe thermometer, while stirring water continually.

**Flywheel magneto**

6CM	6CEM	✓
8CM	8CEM	✓

1. Inspect:

- Flywheel teeth **a**
Wear/Damage → Replace.

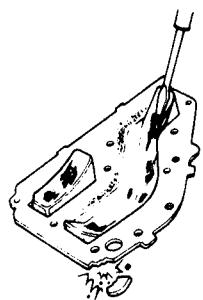
**Exhaust manifold**

1. Inspect:

- Exhaust manifold
Carbon deposits → Clean.
Crack/Corrosion → Replace.

POWR

CYLINDER, PISTON AND CRANKSHAFT



Exhaust cover

1. Inspect:

- Exhaust cover
Crack/Damage → Replace.
Carbon deposit → Clean.

CAUTION:

Do not scratch the fitting surface of the cylinder and exhaust cover.



Oil seal housing

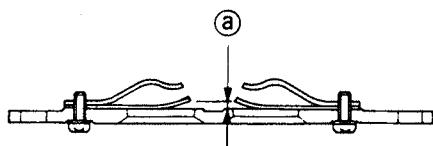
1. Inspect:

- Oil seal housing
Crack/Damage → Replace.

Reed valve

1. Inspect:

- Reed valve
Crack/Damage → Replace.

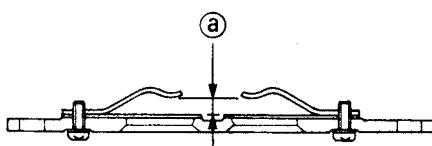


2. Measure:

- Valve bending ①
Out of specification → Replace.



Valve bending limit:
0.2 mm (0.008 in)

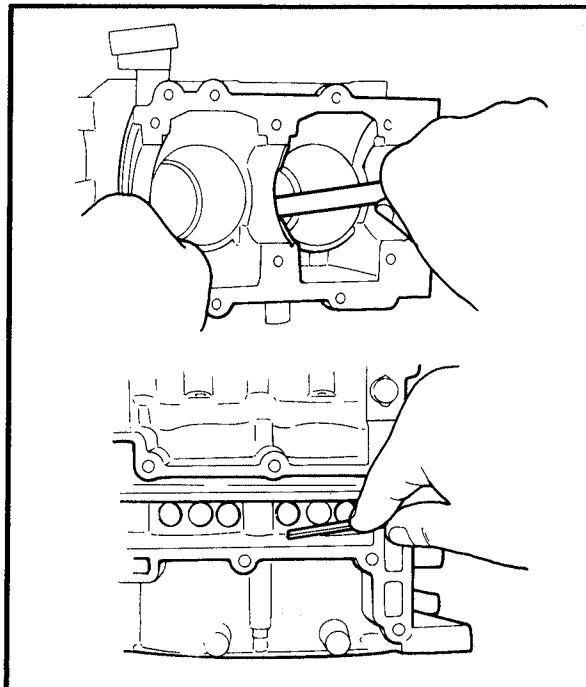


3. Measure:

- Valve Stopper height ①
Out of specification → Replace.



Valve stopper height:
 $4.5 \pm 0.2 \text{ mm}$
($0.177 \pm 0.008 \text{ in}$)

**Cylinder body****1. Inspect:**

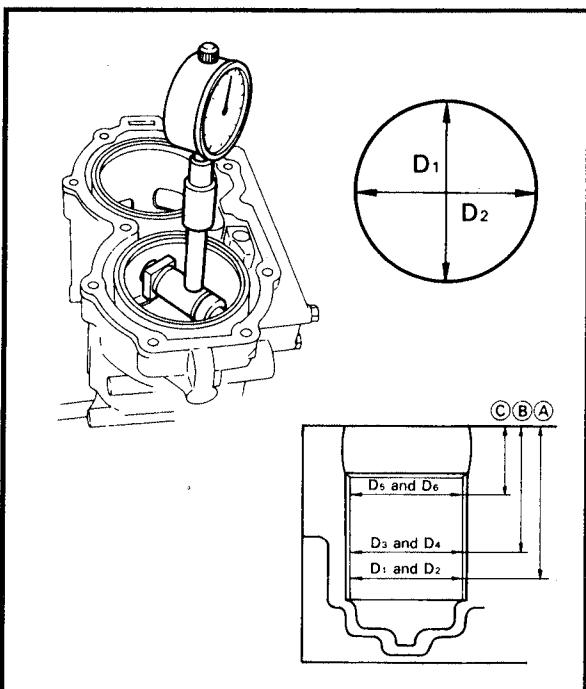
- Water jacket
Material deposit/Corrosion → Clean.
- Cylinder inner surface
Score marks → Repair.
Use #600 ~ 800 grit wet sandpaper.

CAUTION:

Do not scratch the fitting surfaces of the cylinder and cylinder head.

2. Inspect:

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

**CAUTION:**

Do not scratch the fitting surfaces of the cylinder and exhaust cover.

3. Measure:

- Cylinder bore "D"
Use cylinder gauge.
Out of specification → Rebore or replace.

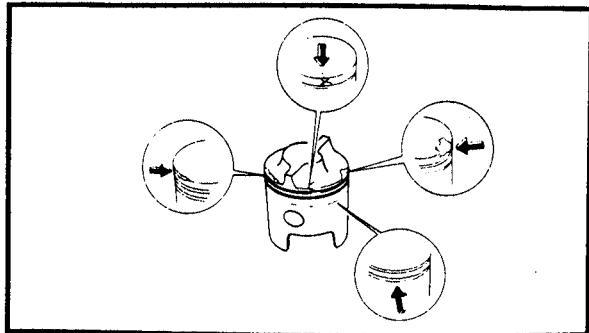
NOTE:

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

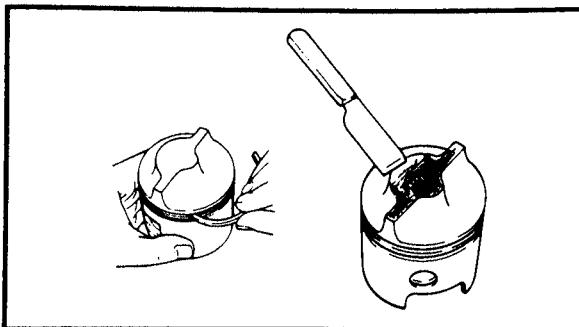
	Standard	Wear limit
Cylinder bore D:	50.00 ~ 50.03 mm (1.9685 ~ 1.9697 in)	50.1 mm (1.972 in)
Cylinder taper T:	—	0.08 mm (0.003 in)

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

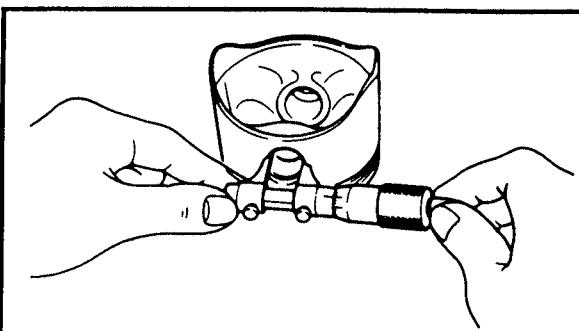
- (A) 100 mm (3.94 in)
(B) 90 mm (3.70 in)
(C) 35 mm (1.38 in)

**Piston****1. Inspect:**

- Piston wall
Wear/Scratch/Damage → Replace.

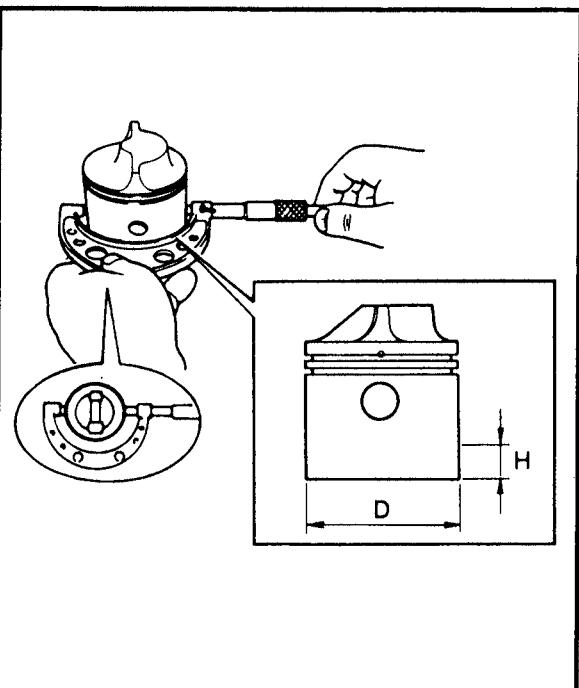
**2. Inspect:**

- Piston head
- Piston ring groove
Carbon deposit → Clean.

CAUTION!**Do not scratch the piston crown.****3. Measure:**

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

	Piston pin boss inside diameter: 12.004 ~ 12.015 mm (0.4726 ~ 0.4730 in)
--	---

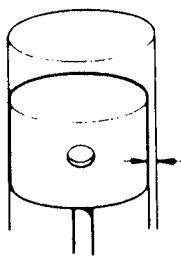
**4. Measure:**

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

	Measuring point "H"	Piston diameter
Standard	10 mm (0.4 in)	49.955 ~ 49.980 mm (1.9667 ~ 1.9677 in)
Over 1* Size 2	-	50.25 mm (1.978 in)* 50.50 mm (1.988 in)

*: Except for U.S.A.

NOTE:**"H" 10 mm (0.4 in) from the bottom edge.**

**Piston to cylinder clearance****1. Calculate:**

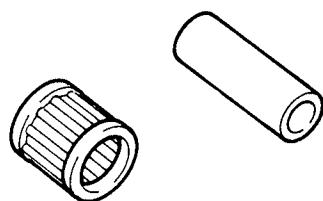
- Piston to clearance

Out of specification → Replace piston and piston ring and/or cylinder.

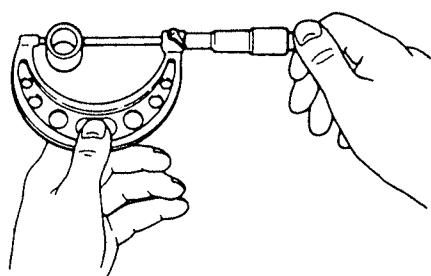
$$\text{Piston clearance} = \text{Cylinder bore} - \text{Piston diameter}$$



Piston clearance:
0.040 ~ 0.045 mm
(0.0016 ~ 0.0018 in)

**Piston pin and small end bearing****1. Inspect:**

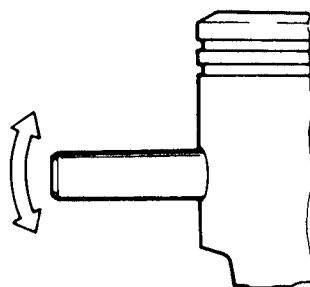
- Piston pin
 - Small end bearing
- Signs of heat discoloration → Replace.
Scratch/Damage → Replace.

**2. Measure:**

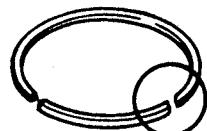
- Piston pin diameter
- Use a micrometer.
Out of specification → Replace.



Piston pin diameter:
11.996 ~ 12.000 mm
(0.4723 ~ 0.4724 in)

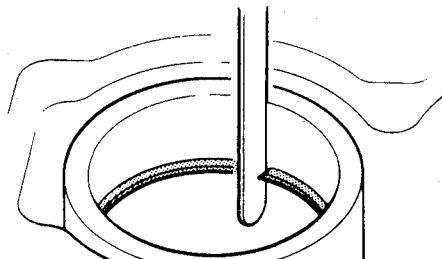
**3. Check:**

- Free play (when the piston pin is inserted in the piston.)
- There should be no noticeable free play.
Free play exists → Replace the pin and/or piston.

**Piston ring****1. Inspect:**

- Piston ring

Breakage/Damage → Replace.

**2. Measure:**

- End gap

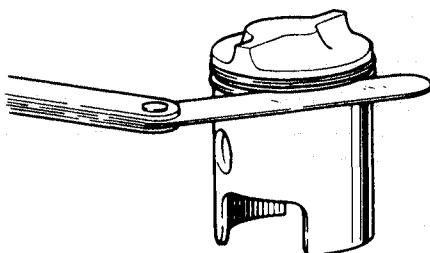
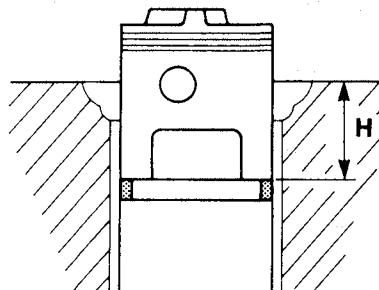
Use a feeler gauge.

Out of specification → Replace.

	End gap:	Measuring point "H"
Top	0.15 ~ 0.35 mm (0.006 ~ 0.014 in)	60 mm (2.36 in)
2nd	0.15 ~ 0.35 mm (0.006 ~ 0.014 in)	

NOTE:

- Install the piston ring into the cylinder.
Push the ring with the piston crown.
- "H" 60 mm (2.36 in) from the contact face.

**3. Measure:**

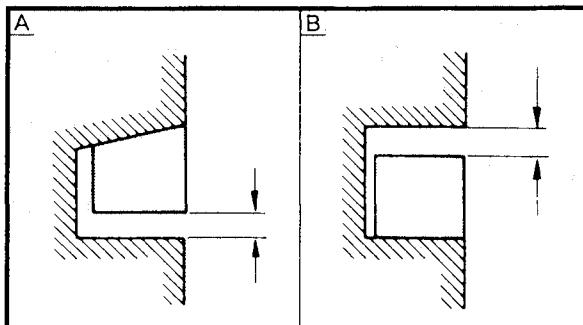
- Side clearance

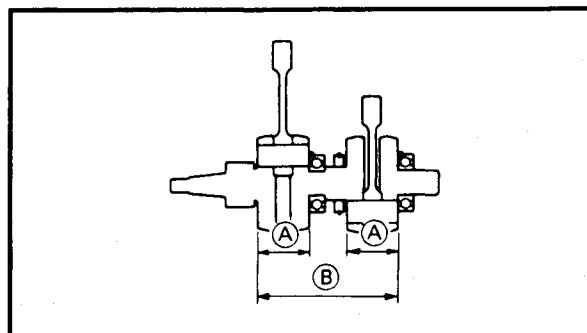
Use a feeler gauge.

Out of specification → Replace piston and/or ring.

	Side clearance:
Top:	0.02 ~ 0.06 mm (0.0008 ~ 0.0024 in)
2nd:	0.03 ~ 0.07 mm (0.0012 ~ 0.0028 in)

A Top
B 2nd



**Crankshaft****1. Measure:**

- Crank width A
- Crank width B

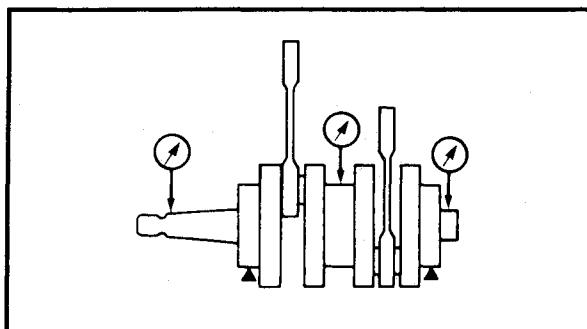
Out of specification → Replace.

**Crank width A:**

39.90 ~ 39.95 mm
(1.571 ~ 1.573 in)

Crank width B:

101.7 ~ 102.0 mm
(4.004 ~ 4.016 in)

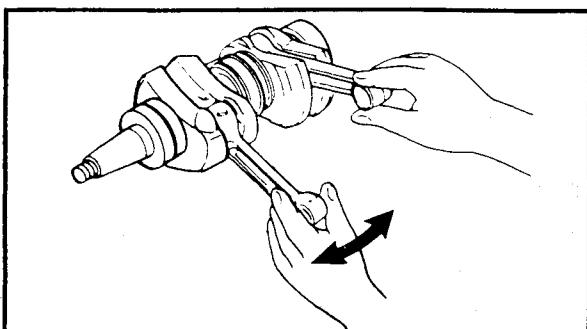
**2. Measure:**

- Runout

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

**Runout limit:**

0.03 mm (0.0012 in)

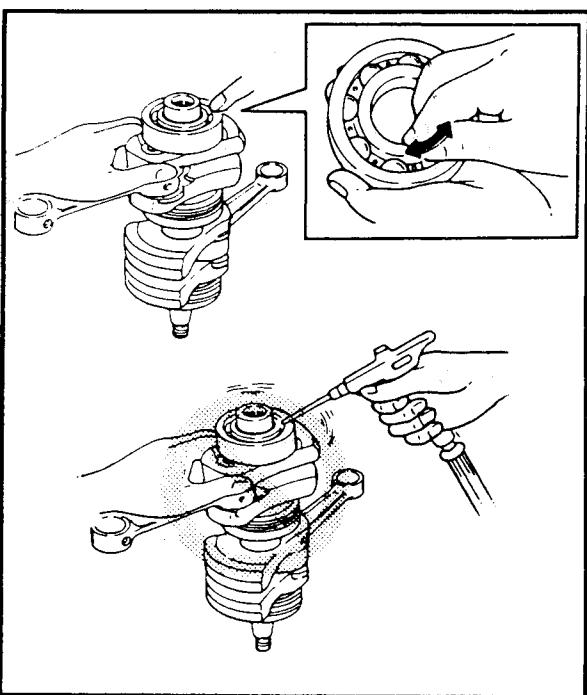
**3. Measure:**

- Axial play

Out of specification → Replace.

**Axial play limit:**

2.0 mm (0.08 in)

**4. Inspect:**

- Crankshaft bearing

Abnormal noise/Turn roughly/
Damage → Replace.

CAUTION:

Blow-dry the bearing without spinning it
marking scratches on the bearing balls.

POWR

CYLINDER, PISTON AND CRANKSHAFT

ASSEMBLY AND INSTALLATION

Bearing

1. Install:

- Bearing ①
- Bearing ②

NOTE: _____

Place the plate under the connecting rod big end, slip the bearing over the crank-shaft, and press-fit the bearing.

CAUTION: _____

- After placing the plate under the big end, make sure the connecting rod is held in a vertical position.
- When press-fitting the bearing, be sure to force the inner race. Do not force the outer race.

Piston and piston ring

1. Install:

- Piston ring (2nd) ①
- Piston ring (top) ②

NOTE: _____

- Piston rings should be replaced as a set.
- Take care not to scratch the piston or break piston rings.
- Align the each ring end gap with their locating pins.
- After fitting the rings, check that they move smoothly.
- Apply 2-stroke outboard motor oil to the pistons and rings.

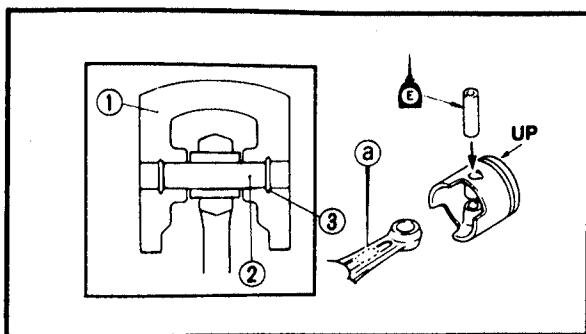
Crankshaft and piston

1. Install:

- Small end needle bearing

NOTE: _____

Apply 2-stroke outboard motor oil to the bearing.

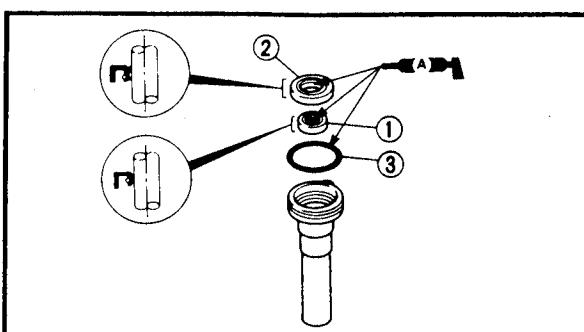
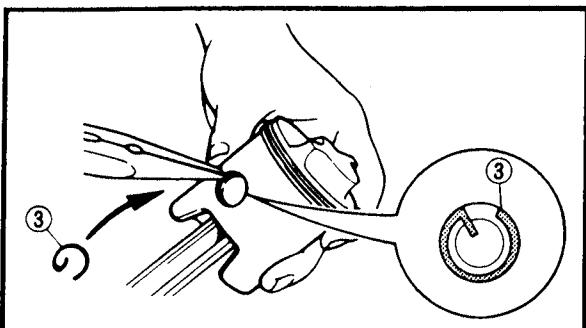


2. Install:

- Piston ①
- Piston pin ②
- Piston pin clip ③

NOTE: _____

- Mold mark ④ faces in the same direction as the "UP" mark on the piston.
- When no piston is replaced, be sure to re-install the pistons in their original cylinder.
- Always use the new circlip.
- Apply 2-stroke outboard motor oil to the piston pin.

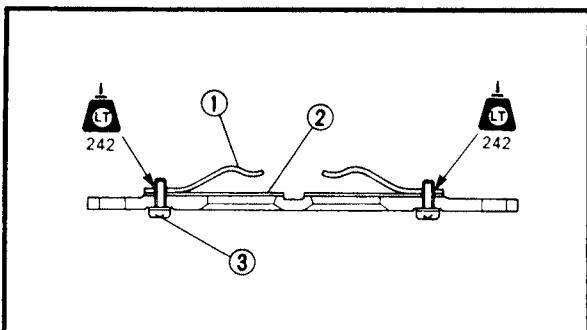
**Oil seal housing**

1. Install:

- Oil seal ①
- Oil seal ②
- O-ring ③

NOTE: _____

- Apply water resistant grease to the oil seal lip and the O-ring.
- When press-fitting the oil seal, be sure that it faces in the correct direction.
- Always use the new O-ring.

**Reed valve assembly**

1. Install:

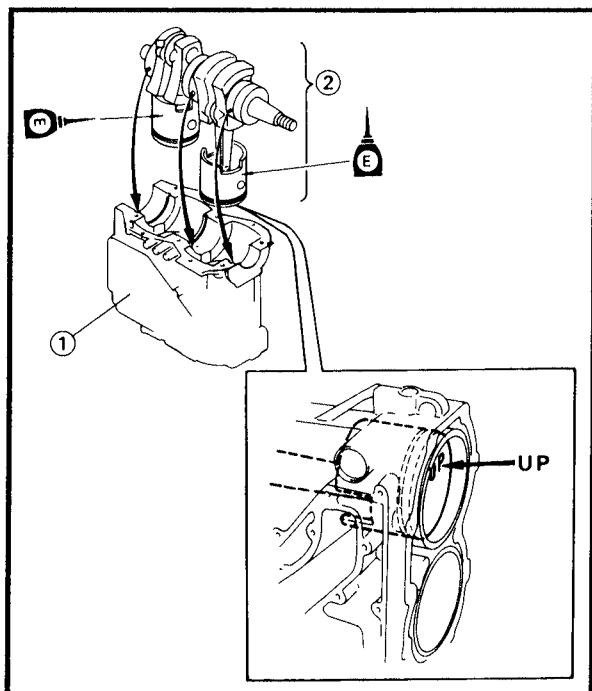
- Reed valve ①
- Valve stopper ②
- Screw ③

NOTE: _____

Apply blue LOCTITE® No. 242 to the screw.



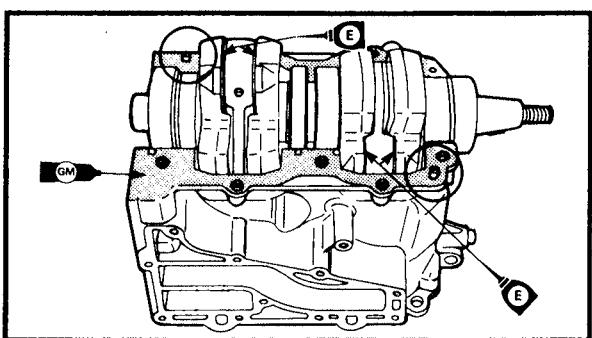
Screw:
1 Nm (0.1 m · kg, 0.7 ft · lb)

**Cylinder body and crankcase****1. Install:**

- Cylinder body ①
- Crankshaft and piston ②

NOTE: _____

- Apply 2-stroke outboard motor oil to the cylinder wall, piston and its rings.
- Align the piston ring end gaps with the respective locating pins.
- Fit the bearing and the labyrinth seal locating pins in the cylinder body.

**2. Apply:**

- Gasket maker
Onto the connecting surfaces of the crankcase and cylinder body.

NOTE: _____

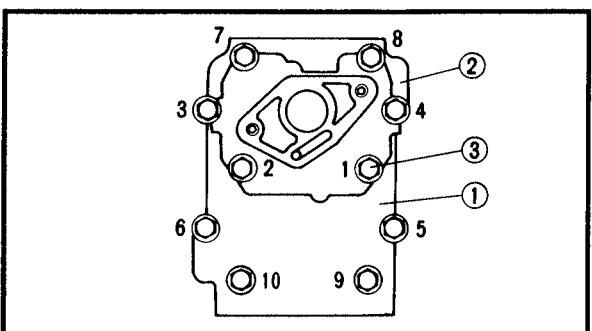
- Clean the connecting surfaces of the crankcase and cylinder body before applying the Gasket Maker.
- Gasket maker should be so applied that it does not overflow the contacting surface.

3. Install:

- Dowel pin
- Crankcase ①
- Reed valve assembly
- Intake manifold ②
- Bolt ③

NOTE: _____

- Apply blue LOCTITE® No. 242 to the bolts.
- Tighten the bolts in sequence and in two steps of torque.

**Bolt:****1st:**

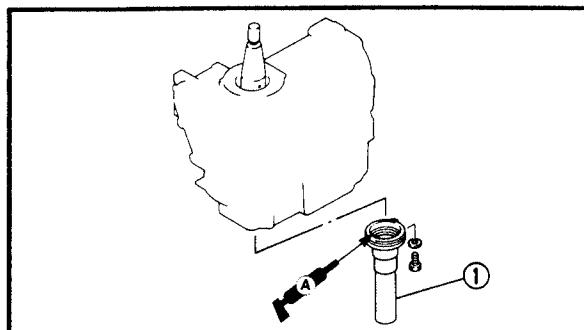
6 Nm (0.6 m · kg, 4.3 ft · lb)

2nd:

11 Nm (1.1 m · kg, 8.0 ft · lb)

POWR

CYLINDER, PISTON AND CRANKSHAFT

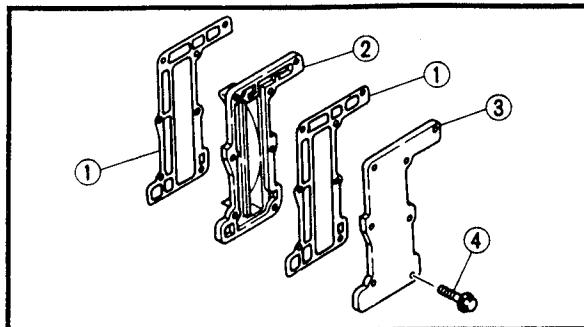


4. Install:

- Oil seal housing ①

NOTE: _____

Apply water resistant grease to connecting surface of oil seal housing.



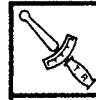
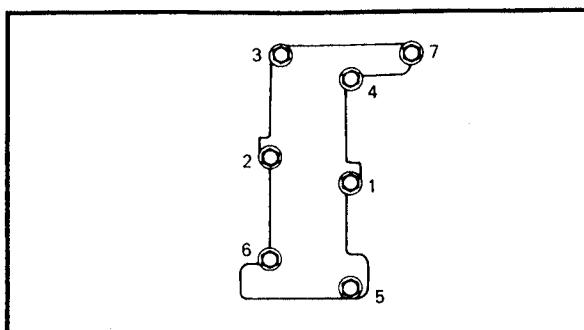
Exhaust cover

1. Install:

- Gasket ①
- Exhaust inner cover ②
- Exhaust outer cover ③
- Bolt ④

NOTE: _____

- Apply LOCTITE® No. 572 to the bolts.
- Tighten the bolts in sequence and in two steps of torque.



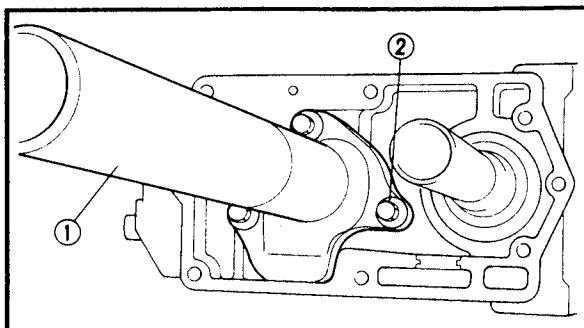
Bolt:

1st:

4 Nm (0.4 m · kg, 2.9 ft · lb)

2nd:

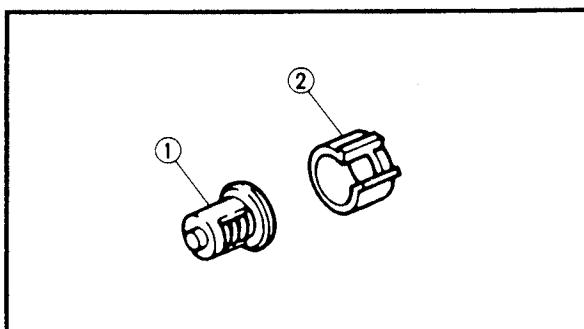
8 Nm (0.8 m · kg, 5.8 ft · lb)



Exhaust manifold

1. Install:

- Exhaust manifold ①
- Bolt ②



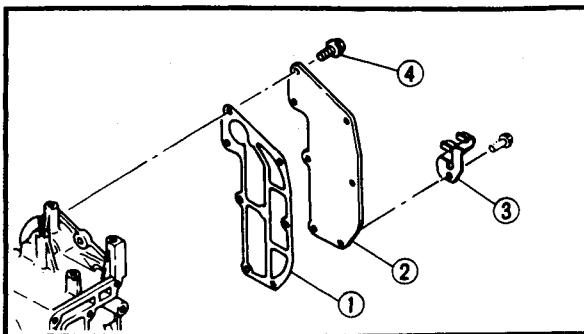
Cylinder head cover

1. Install:

- Thermostat ①
- Collar ②

POWR

CYLINDER, PISTON AND CRANKSHAFT

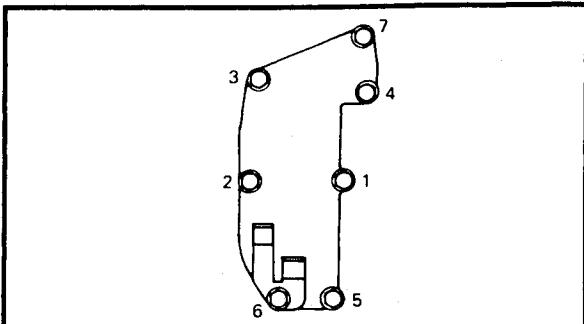


2. Install:

- Gasket ①
- Cylinder head cover ②
- Clamp ③
- Bolt ④

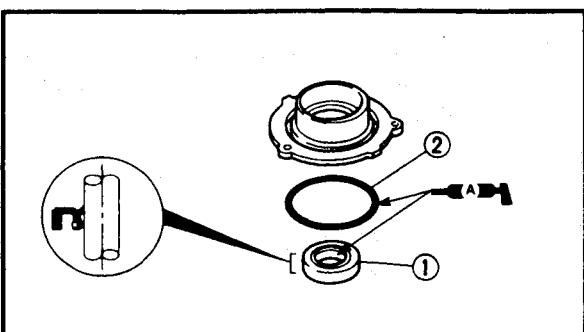
NOTE: _____

- Apply 2-stroke outboard motor oil to the bolts.
- Tighten the bolts in sequence and in two steps of torque.



Bolt (cylinder head cover):

- 1st:
4 Nm (0.4 m · kg, 2.9 ft · lb)
2nd:
8 Nm (0.8 m · kg, 5.8 ft · lb)



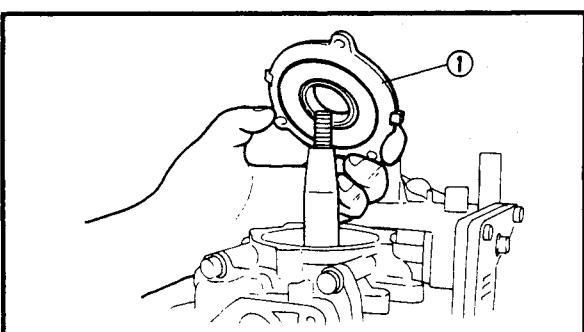
Oil seal housing

1. Install:

- Oil seal ①
- O-ring ②

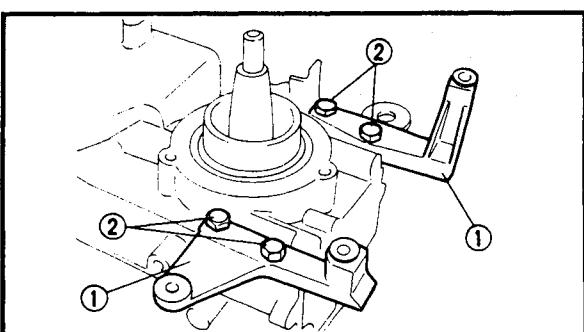
NOTE: _____

Apply water resistant grease to the oil seal lip and the O-ring.



2. Install:

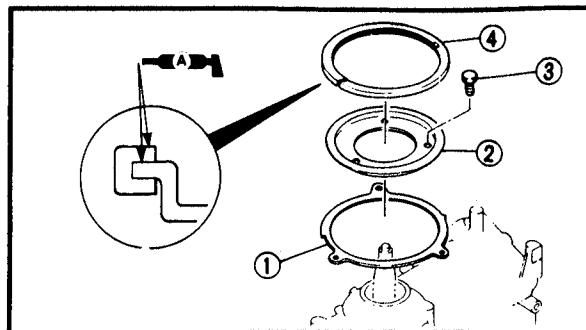
- Oil seal housing ①



Flywheel magneto

1. Install:

- Starter stay ①
- Bolt ②

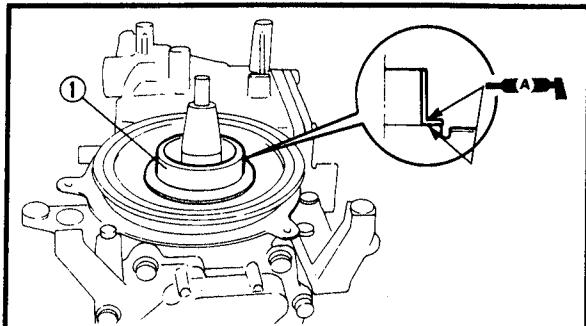


2. Install:

- Friction plate ①
- Retainer ②
- Bolt ③
- Retainer ring ④

NOTE: _____

Apply water resistant grease to the retainer ring.

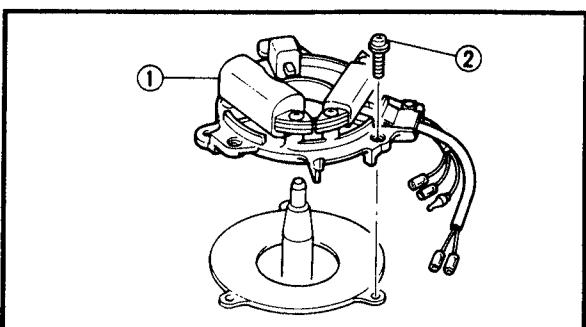


3. Install:

- Bushing ①

NOTE: _____

Apply water resistant grease to both inner and outer surfaces of the bushing.

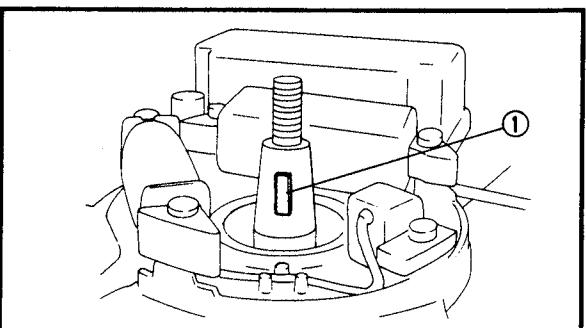


4. Install:

- Stator assembly ①
- Screw ②

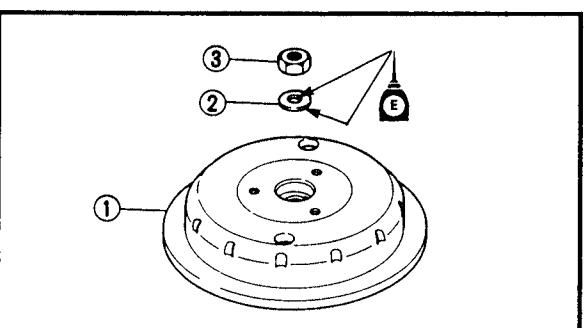
5. Check:

- Stator assembly
- Stiff → Repair.



6. Install:

- Woodruff key ①



7. Install:

- Flywheel magneto ①
- Washer ②
- Nut ③

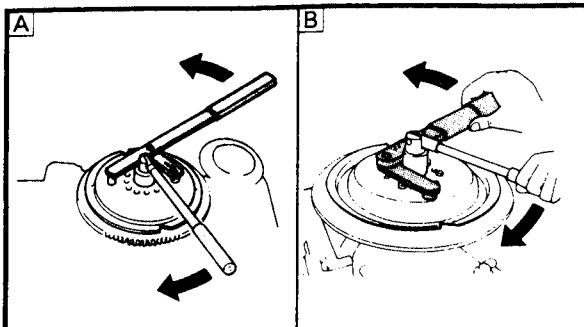
NOTE: _____

- Make sure the woodruff key is properly seated in the keyway of the crankshaft.
- Apply 2-stroke outboard motor oil to both surfaces of the washer.

POWR



CYLINDER, PISTON AND CRANKSHAFT



**Flywheel holder:
YB-6139/90890-06522**

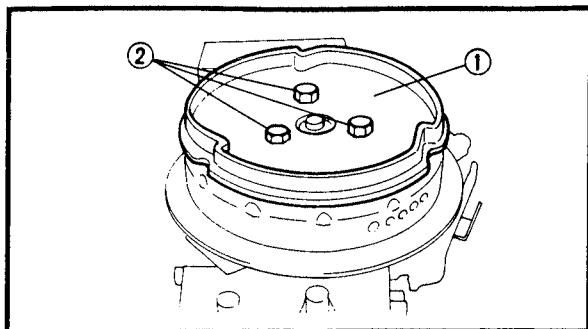
A For USA and CANADA

B Except for USA and CANADA



Nut:

45 Nm (4.5 m · kg, 32 ft · lb)



8. Install:

- Starter pulley ①
- Bolt ②

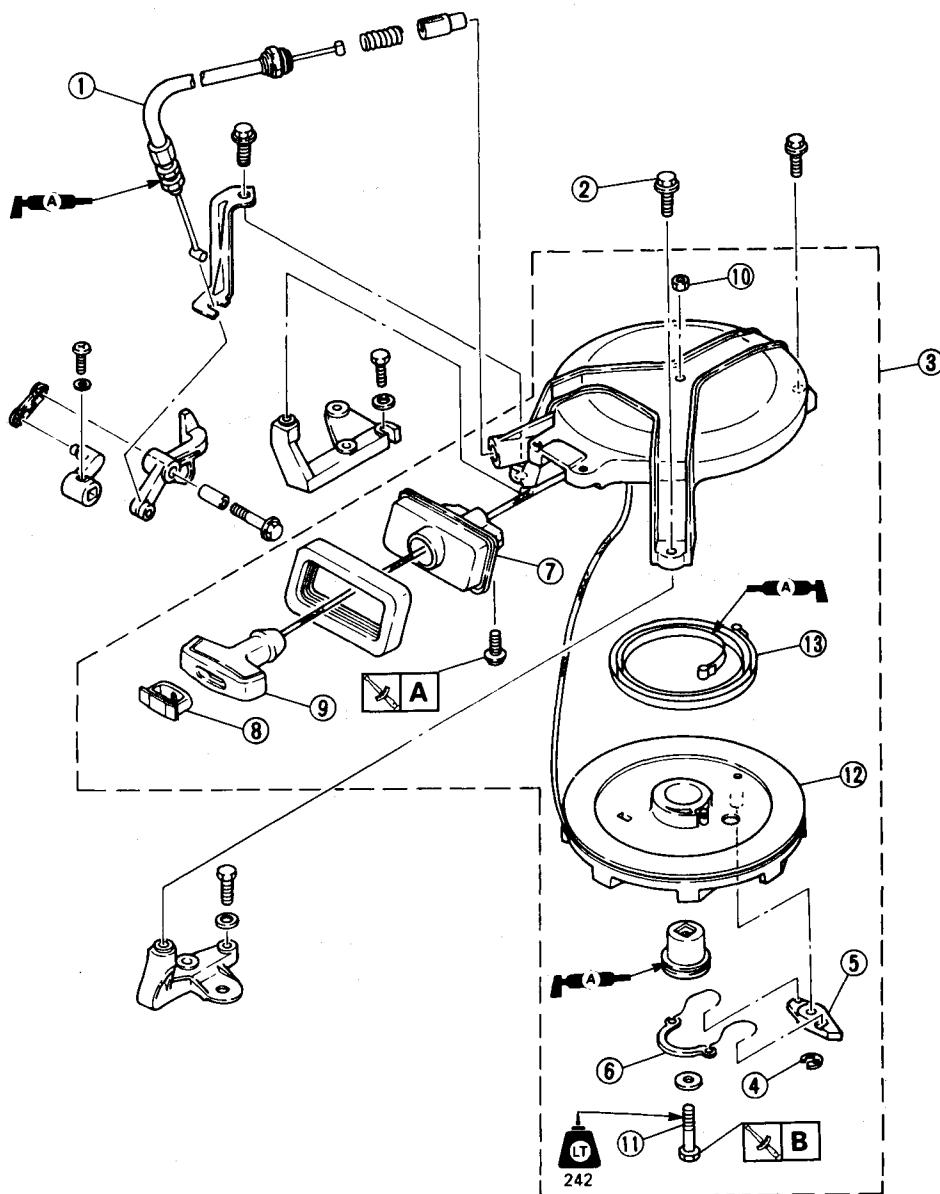
POWR**RECOIL STARTER****RECOIL STARTER****PREPARATION FOR REMOVAL**

- Removal the top cowling.

WARNING

Wear a proper safety goggle and gloves for protect your eyes and hands. Because; the spiral jumps out and may injure a person.

A	5 Nm (0.5 m · kg, 3.6 ft · lb)
B	4 Nm (0.4 m · kg, 2.9 ft · lb)



POWR



RECOIL STARTER

Extent of removal: ① Recoil starter removal ② Recoil starter disassembly

Extent of removal	Order	Part name	Q'ty	Remarks
	1	Start-in-gear protection wire	1	Disconnect the wire at starter side.
	2	Bolt	3	
	3	Recoil starter assembly	1	
	4	Circlip	1	
	5	Drive pawl	1	
	6	Drive pawl spring	1	
	7	Rope guide	1	
	8	Cover	1	
	9	Starter handle	1	
	10	Nut	1	
	11	Bolt	1	
	12	Sheave drum	1	
	13	Spiral spring	1	} Refer to "REMOVAL POINTS".

REMOVAL POINTS

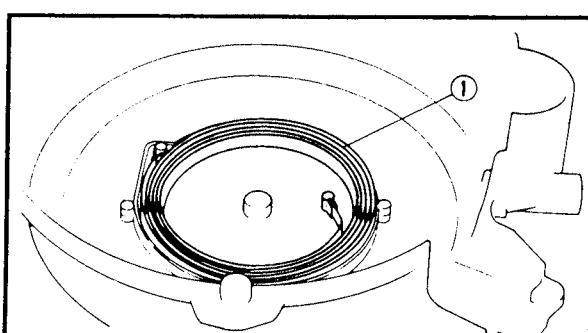
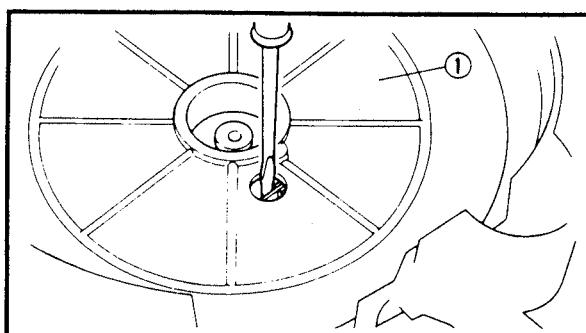
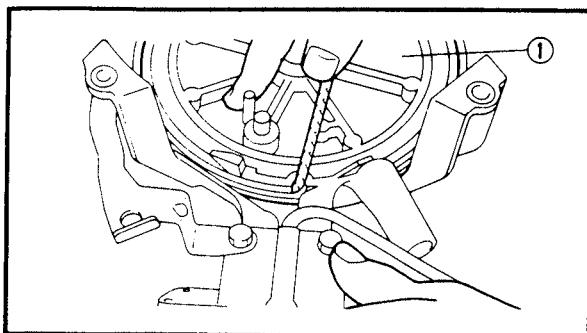
Sheave drum

1. Turn:

- Sheave drum ①
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:

- Nut
- Bolt
- Bushing
- Sheave drum ①

NOTE: _____

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

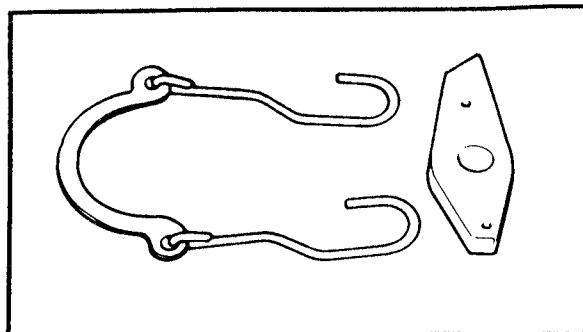
Spiral spring

1. Remove:

- Spiral spring ①

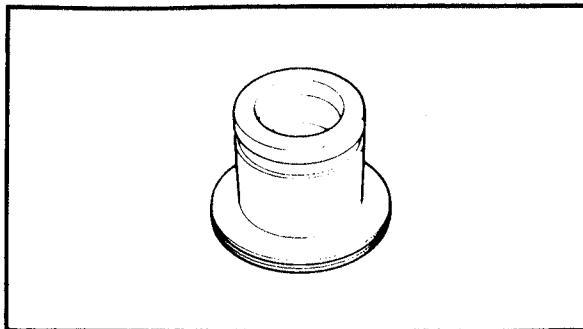
NOTE: _____

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.

POWR**RECOIL STARTER****INSPECTION****Drive pawl and spring**

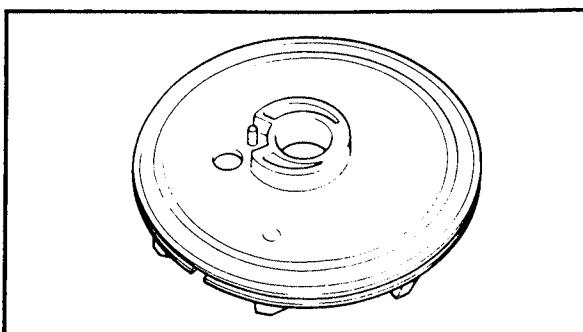
1. Inspect:

- Drive pawl
Crack/Wear/Damage → Replace.
- Drive pawl spring
Broken/Bent/Damage → Replace.

**Bushing**

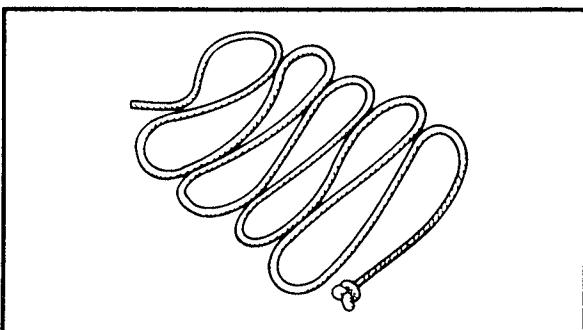
1. Inspect:

- Bushing
Crack/Damage → Replace.

**Sheave drum**

1. Inspect:

- Sheave drum
Crack/Damage → Replace.

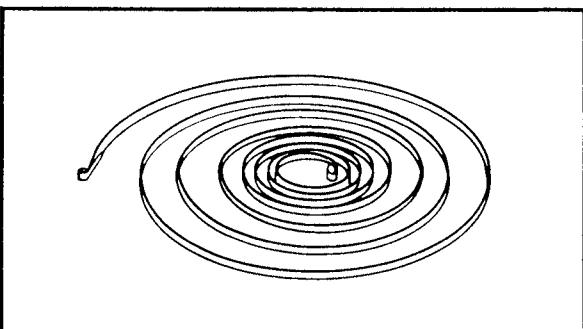
**Starter rope**

1. Inspect:

- Starter rope
Broken/Wear/Damage → Replace.

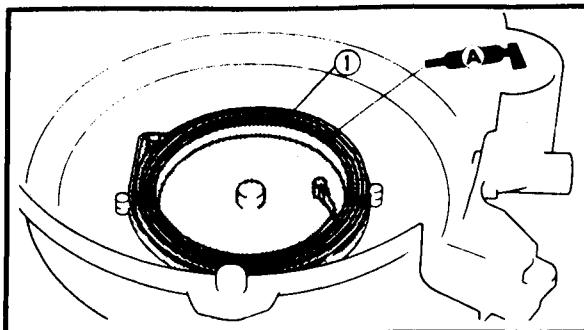
NOTE: _____

When replacing the rope, cut it to the specified length and burn the rope end so that it will not fray.

**Starter rope length:**
1,850 mm (72.8 in)**Spiral spring**

1. Inspect:

- Spiral spring
Broken/Bent/Damage → Replace.

POWR**RECOIL STARTER**

ASSEMBLY AND INSTALLATION

Recoil starter

1. Install:

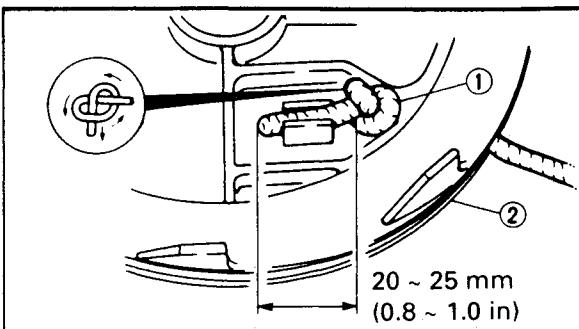
- Spiral spring ①

NOTE:

- After installing the new spiral spring, 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.

⚠ WARNING

The spiral spring may jump out so use special care.

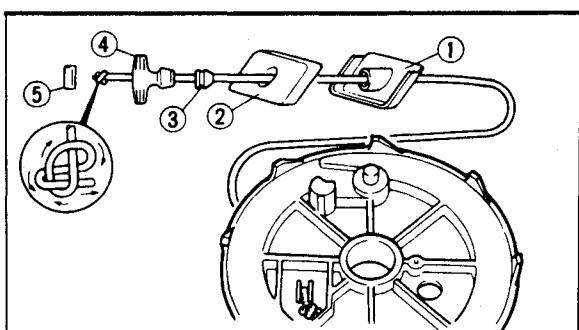


2. Install:

- Starter rope ①
- Sheave drum ②

NOTE:

Make a knot in the starter rope, leaving a 20 to 25 mm (0.8 to 1.0 in) portion of the rope end.

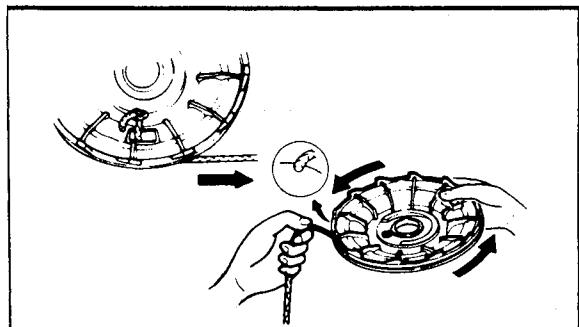


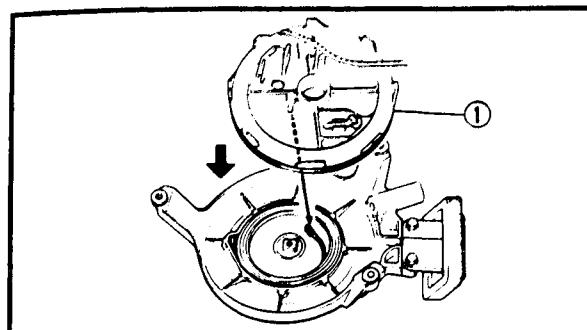
3. Install:

- Rope guide ①
- Rubber seal ②
- Damper ③
- Starter handle ④
- Cover ⑤

NOTE:

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

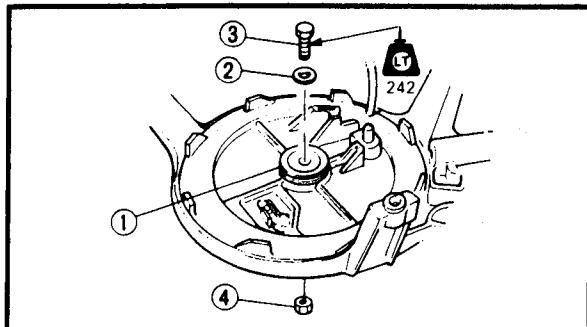


POWR**RECOIL STARTER****4. Install:**

- Sheave drum ①

NOTE:

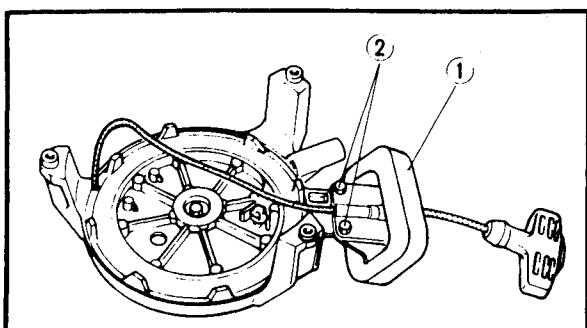
Position the inner end of the spiral spring on the retainer post of the sheave drum.

**5. Install:**

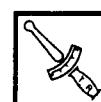
- Bushing ①
- Washer ②
- Bolt ③
- Nut ④

**Bolt:**

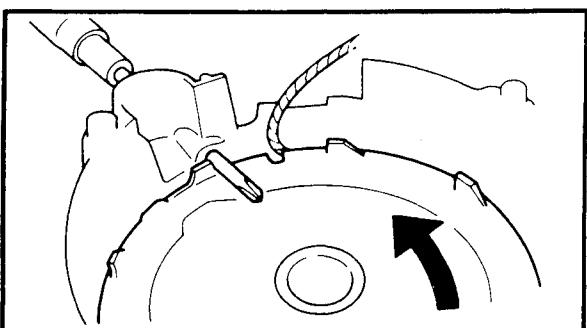
4 Nm (0.4 m · kg, 2.9 ft · lb)

**6. Install:**

- Rope guide ①
- Bolt ②

**Bolt:**

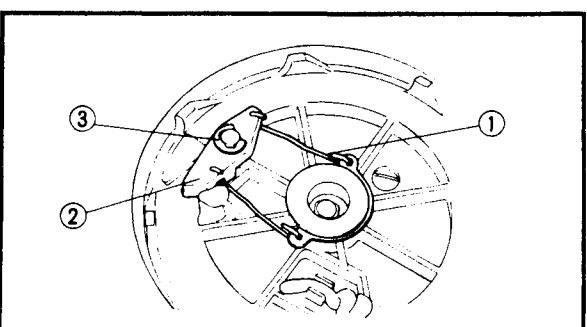
5 Nm (0.5 m · kg, 3.6 ft · lb)

**7. Set:**

- Spiral spring

NOTE:

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

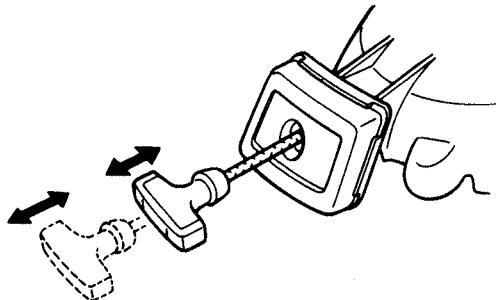
**8. Install:**

- Drive pawl spring ①
- Drive pawl ②
- Circlip ③

POWR

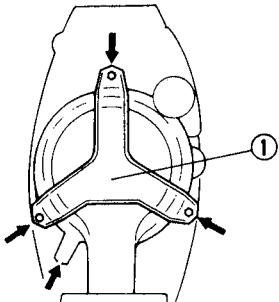


RECOIL STARTER



9. Check:

- Starter operation
Rough operation → Repair.



10. Install:

- Recoil starter assembly ①
- Bolt
- Start-in-gear protection wire

11. Adjust:

- Start-in-gear protection wire
Refer to page 3-13.



CHAPTER 6

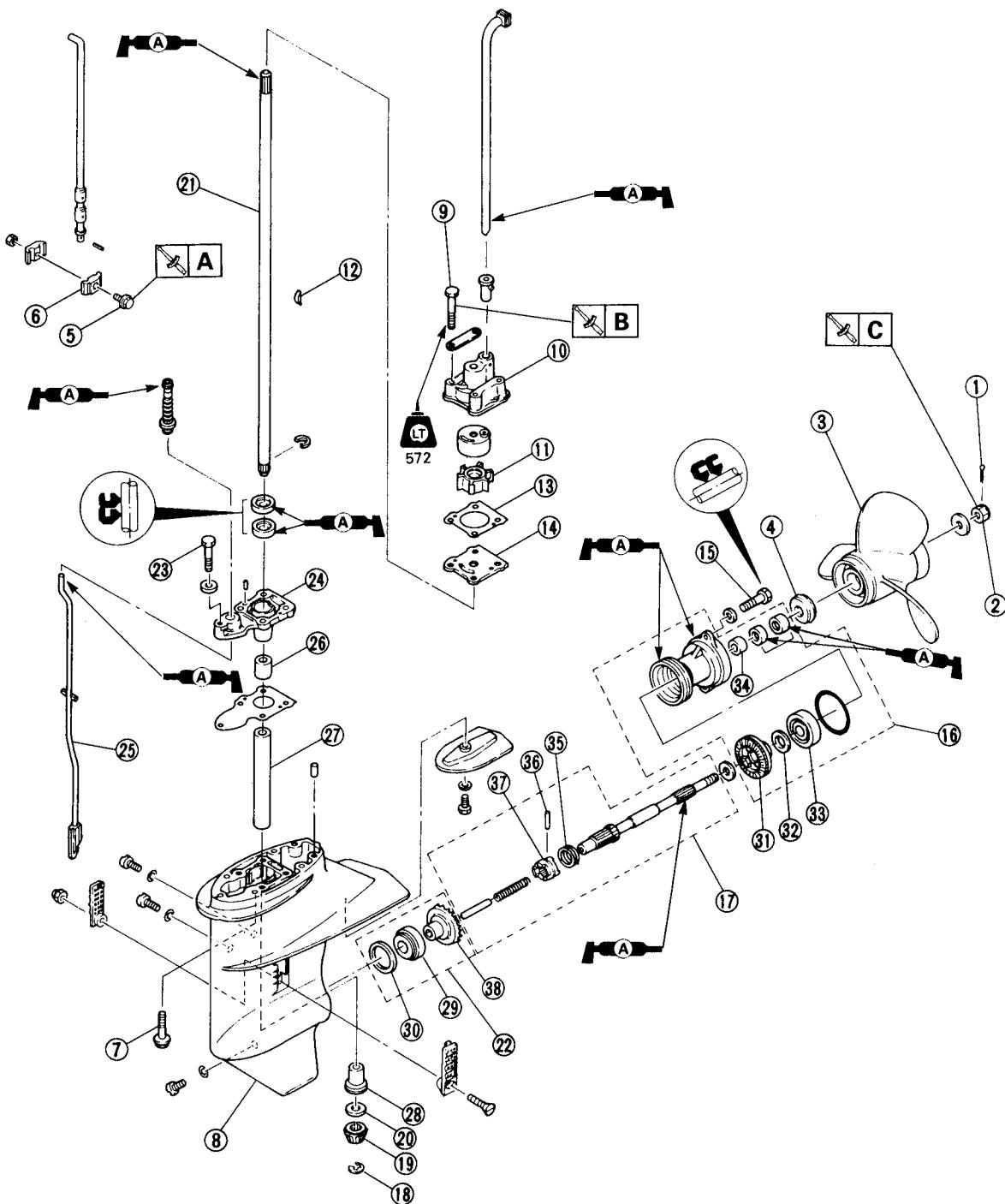
LOWER UNIT

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LOWR**LOWER UNIT****LOWER UNIT****PREPARATION FOR REMOVAL**

- Drain the gear oil.

A	10 Nm (1.0 m · kg, 7.2 ft · lb)
B	11 Nm (1.1 m · kg, 8.0 ft · lb)
C	17 Nm (1.7 m · kg, 12 ft · lb)



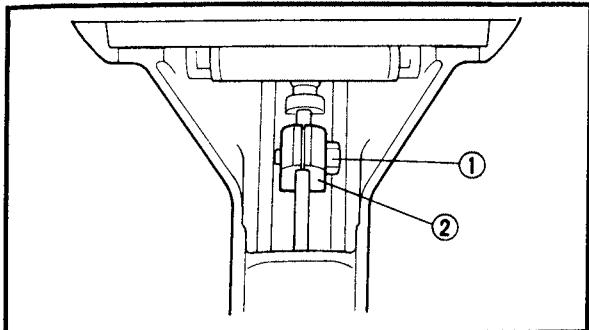
LOWR**LOWER UNIT****NOTE ON REMOVAL AND REASSEMBLY**

- Tilt up the engine a little marks easier oil draining.
- Remove any gasket adhered to the contacting surface.
- The shim pack will be re-use therefore use care not to damage when removing.
- For reassembly, the removed parts should be cleaned with solvent.

Extent of removal: ① Lower unit removal ② Impeller remove
 ③ Lower unit disassembly

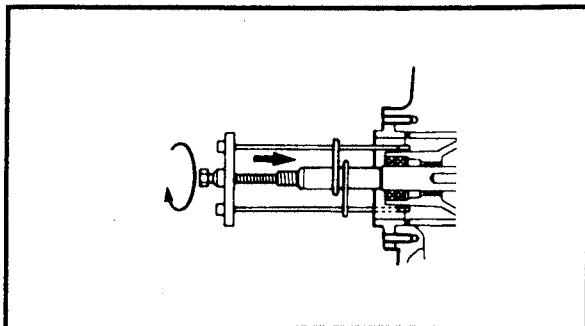
Extent of removal	Order	Part name	Q'ty	Remarks	
	1	Cotter pin	1		
	2	Nut	1		
	3	Propeller	1		
	4	Spacer	1		
	5	Bolt	1		
	6	Shift rod connector	1		Refer to "REMOVAL POINTS".
	7	Bolt	4		
	8	Lower unit	1		
	9	Bolt	4		
	10	Water pump housing	1		
	11	Impeller	1		
	12	Woodruff key	1		
	13	Gasket	2		
	14	Outer plate	1		
	15	Bolt	2		
	16	Reverse gear complete	1		Refer to "REMOVAL POINTS".
	17	Propeller shaft complete	1		
	18	Circlip	1		Refer to "REMOVAL POINTS".
	19	Pinion gear	1		
	20	Pinion gear shim	*		
	21	Drive shaft	1		
	22	Forward gear complete	1		
	23	Bolt	1		
	24	Oil seal housing	1		
	25	Shift shaft	1		
	26	Bushing	1		Refer to "REMOVAL POINTS".
	27	Sleeve	1		
	28	Bushing	1		
	29	Bearing outer race	1		
	30	Forward gear shim	*		
	31	Reverse gear	1		Refer to "REMOVAL POINTS".
	32	Reverse gear shim	*		
	33	Ball bearing	1		
	34	Bushing	1		
	35	Cross pin ring	1		
	36	Cross pin	1		Refer to "REMOVAL POINTS".
	37	Dog clutch	1		
	38	Forward gear	1		

*: As required.

LOWR**LOWER UNIT****REMOVAL POINTS****Shift shaft**

1. Remove:

- Bolt ①
- Shift rod connector ②

**Reverse gear complete**

1. Remove:

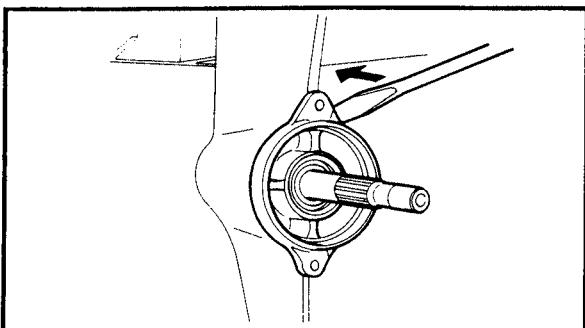
- Reverse gear complete

**Bearing housing puller:**

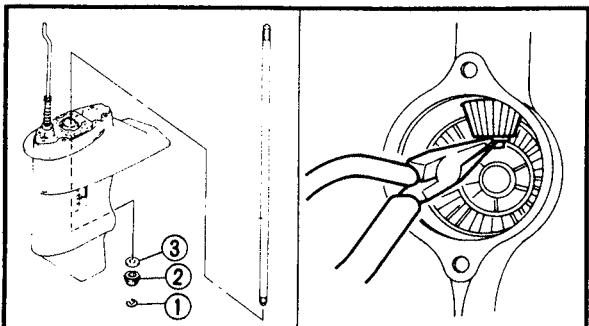
YB-6234

Universal puller:

YB-6117

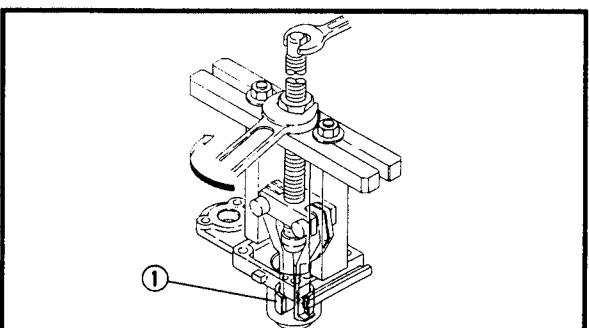
**NOTE:**

Fit a flat-head screwdriver into one of the two notches in the bearing housing flange, and pry the housing off slightly.

**Pinion gear**

1. Remove:

- Circlip ①
- Pinion gear ②
- Pinion gear shim ③

**Bushing**

1. Remove:

- Bushing ① (oil seal housing)

**Stopper guide plate:**

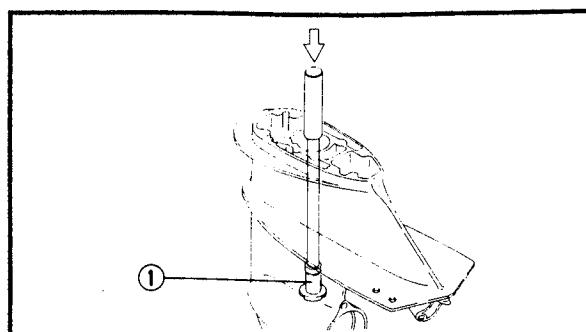
90890-06501

Bearing puller:

90890-06535

Stopper guide stand:

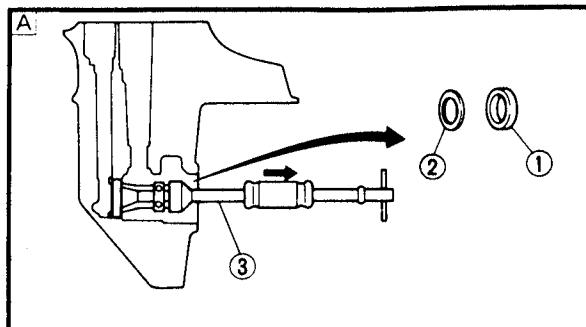
90890-06538

LOWR**LOWER UNIT****2. Remove:**

- Bushing ① (pinion gear)



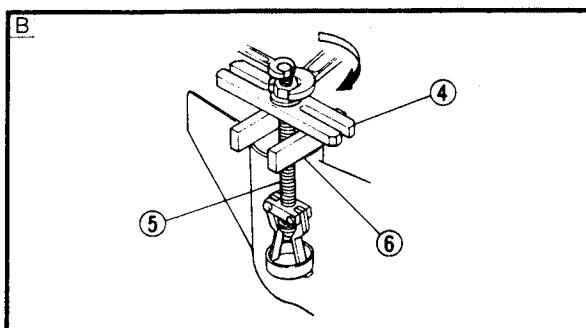
Drive rod:
YB-6229/90890-06652
Bushing attachment:
YB-6028/90890-06650

**Bearing outer race****1. Remove:**

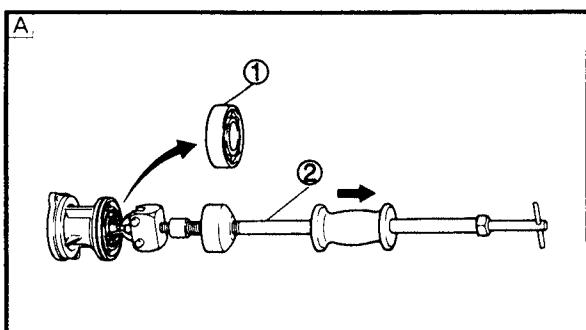
- Bearing outer race ①
- Forward gear shim ②



Slide hammer set:
YB-6096 ③
Stopper guide plate:
90890-06501 ④
Bearing puller:
90890-06535 ⑤
Stopper guide stand:
90890-06538 ⑥



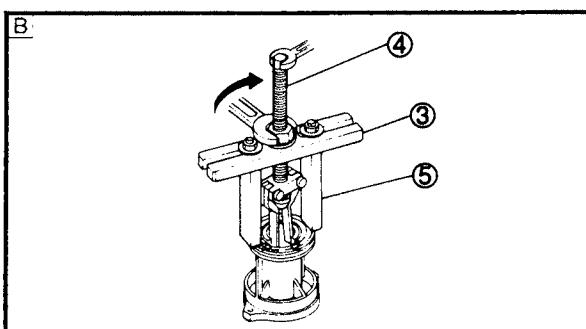
A For USA and CANADA
B Except for USA and CANADA

**Reverse gear****1. Remove:**

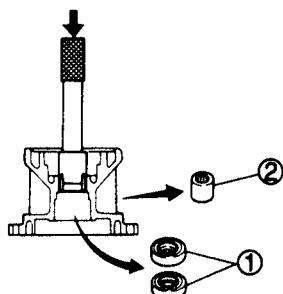
- Ball bearing ①



Slide hammer set:
YB-6096 ②
Stopper guide plate:
90890-06501 ③
Bearing puller:
90890-06535 ④
Stopper guide stand:
90890-06538 ⑤



A For USA and CANADA
B Except for USA and CANADA

LOWR**LOWER UNIT****2. Remove:**

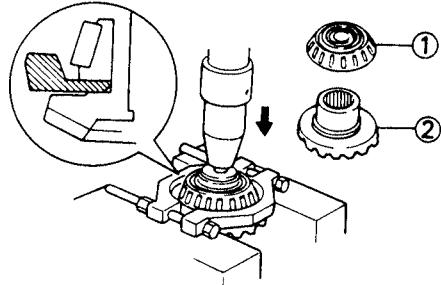
- Oil seal ①
- Bushing ②

**Drive rod:**

/90890-06652

Bushing attachment:

/90890-06649

**Forward gear complete****1. Remove:**

- Taper roller bearing ①
- Forward gear ②

**Bearing separator:**

YB-6219/90890-06534

INSPECTION AND REPAIR**Lower case****1. Clean:**

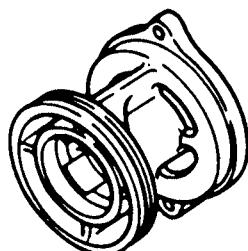
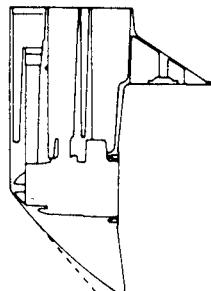
- Gear case
Use a soft brush and solvent.

2. Inspect:

- Water passage
Mineral deposits/Corrosion → Clean.

3. Inspect:

- Lower case
Crack/Damage → Replace.

**Bearing housing****1. Clean:**

- Bearing housing
Use a soft brush and solvent.

2. Inspect:

- Bearing housing
Crack/Damage → Replace.

LOWR



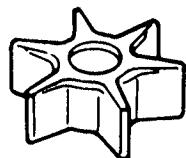
LOWER UNIT



Water pump housing

1. Inspect:

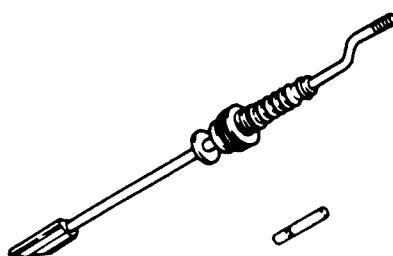
- Water pump housing
Crack/Damage → Replace.



Impeller

1. Inspect:

- Impeller
Crack/Damage → Replace.



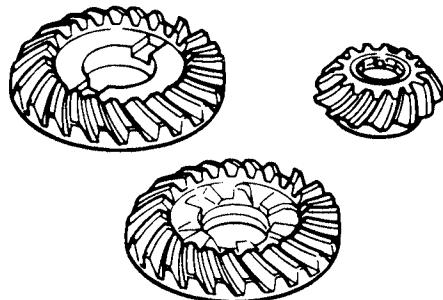
Shift rod

1. Inspect:

- Shift plunger
Wear/Damage → Replace.

2. Inspect:

- Boot
Break/Damage → Replace.



Gear

1. Inspect:

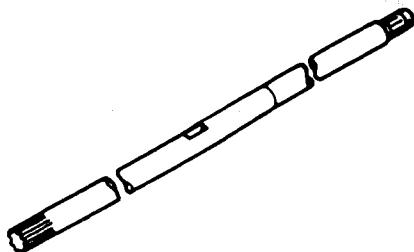
- Teeth
 - Dogs
- Wear/Damage → Replace.



Bearing

1. Inspect:

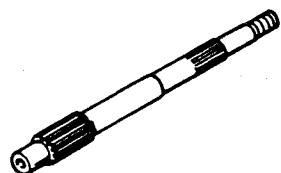
- Bearing
Pitting/Rumbling → Replace.

LOWR**LOWER UNIT****Drive shaft**

1. Inspect:

- Drive shaft

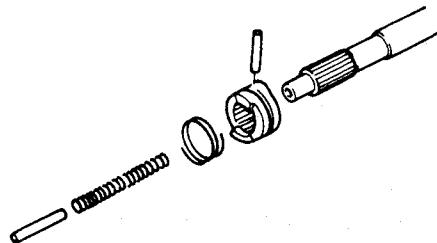
Wear/Damage → Replace.

**Propeller shaft**

1. Inspect:

- Propeller shaft

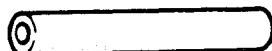
Wear/Damage → Replace.

**Dog clutch**

1. Inspect:

- Dog clutch

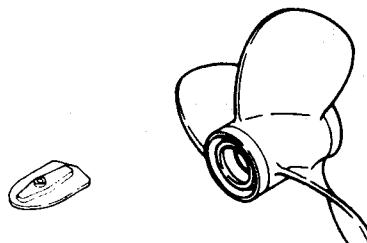
Wear/Damage → Replace.

**Sleeve**

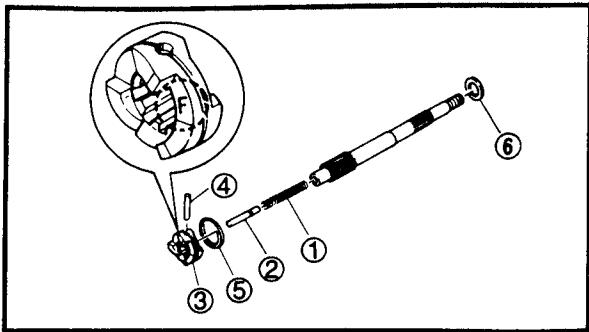
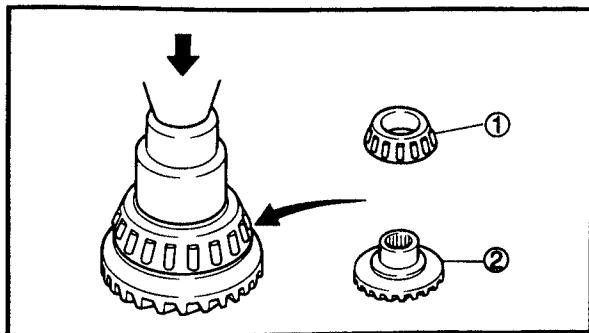
1. Inspect:

- Sleeve

Wear/Damage → Replace.

**Propeller/Anode**

Refer to page 3-8.

LOWR**LOWER UNIT**

ASSEMBLY AND INSTALLATION

Forward gear

1. Install:

- Taper roller bearing ①
- Forward gear ②



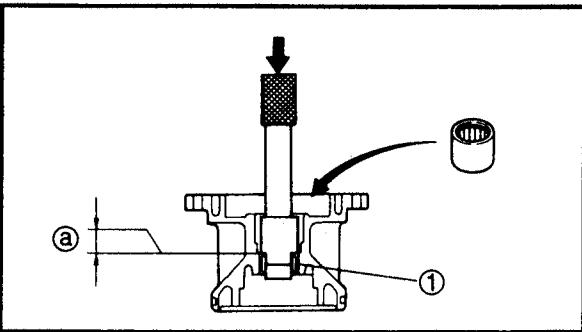
Propeller shaft

1. Install:

- Spring ①
- Plunger ②
- Dog clutch ③
- Cross pin ④
- Cross pin ring ⑤
- Washer ⑥

NOTE:

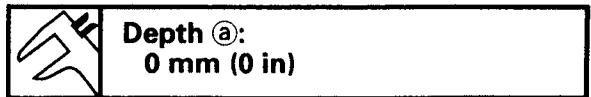
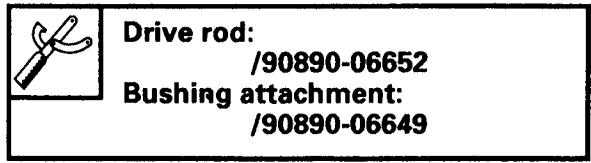
Install the clutch with "F" mark toward the forward gear side.

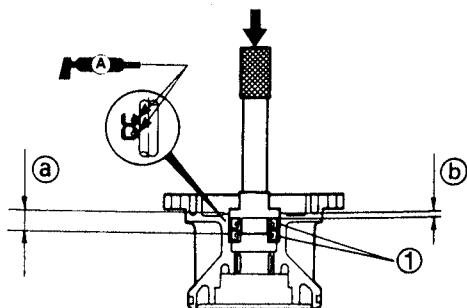


Reverse gear

1. Install:

- Bushing ①



LOWR**LOWER UNIT**

2. Install:

- Oil seal ①

**Oil seal installer:**

YB-6021

Drive rod:

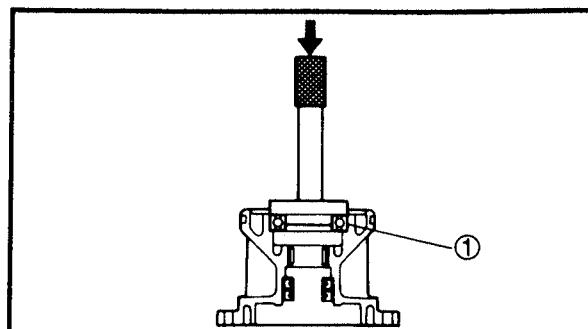
YB-6229

**Depth ②:**

10.0 ~ 10.5 mm (0.39 ~ 0.41 in)

Depth ③:

3.0 ~ 3.5 mm (0.12 ~ 0.14 in)



3. Install:

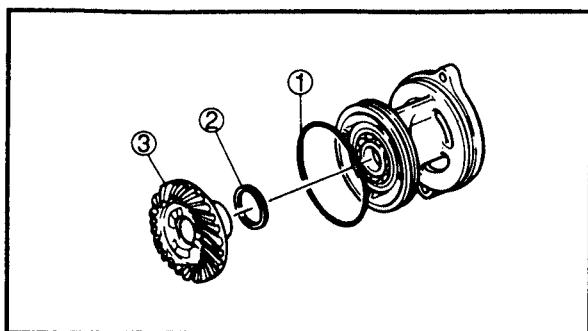
- Ball bearing ①

**Bearing installer:**

YB-6015/90890-06634

Drive rod:

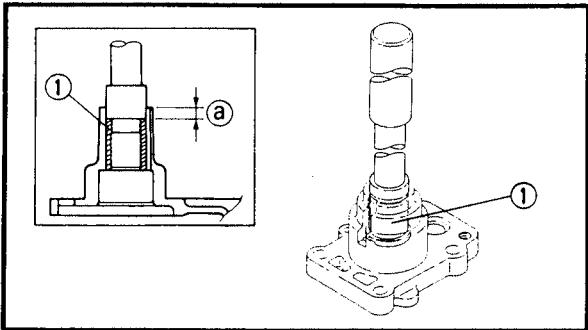
YB-6071/90890-06606

**NOTE:**

Install the bearing with its manufacturer's marks or numbers facing outward.

4. Install:

- O-ring ①
- Reverse gear shim ②
- Reverse gear ③

**Oil seal housing**

1. Install:

- Bushing ①

**Bushing attachment:**

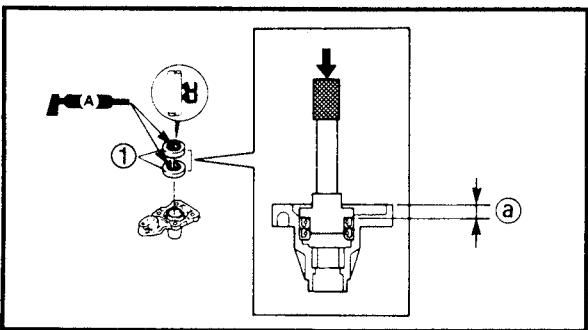
YB-6028/90890-06650

Drive rod:

YB-6229/90890-06652

**Depth ②:**

5 mm (0.20 in)



2. Install:

- Oil seal ①

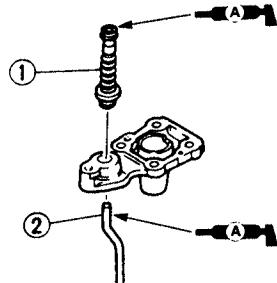
**Depth ②:**

3.0 ~ 3.5 mm (0.12 ~ 0.14 in)

LOWR

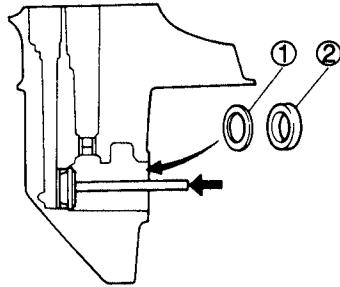


LOWER UNIT



3. Install:

- Boot ①
- Shift shaft ②



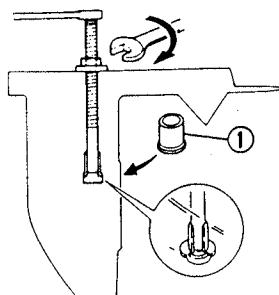
Lower case

1. Install:

- Forward gear shim ①
- Bearing outer race ②



Bearing installer:
YB-6167/90890-06628
Drive rod:
YB-6071/90890-06605

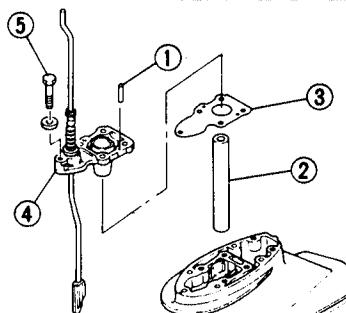


2. Install:

- Bushing ①

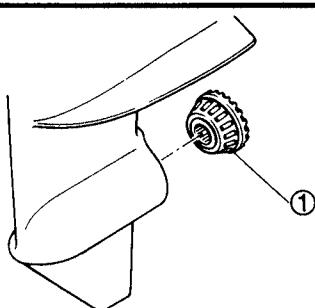


Bushing installer:
YB-6029/90890-06601
Needle bearing installer:
YB-6169
Bushing attachment:
YB-6028/90890-06650



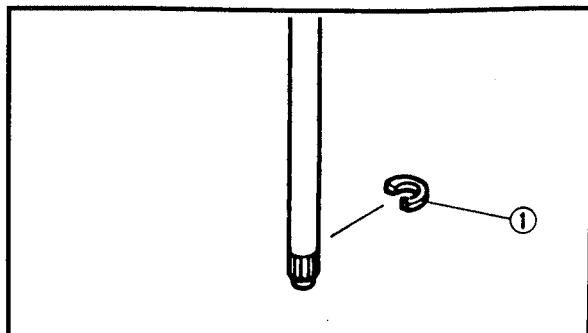
3. Install:

- Dowel pin ①
- Sleeve ②
- Gasket ③
- Oil seal housing ④
- Bolt ⑤

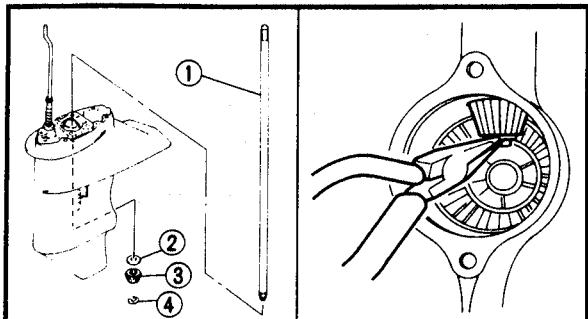


4. Install:

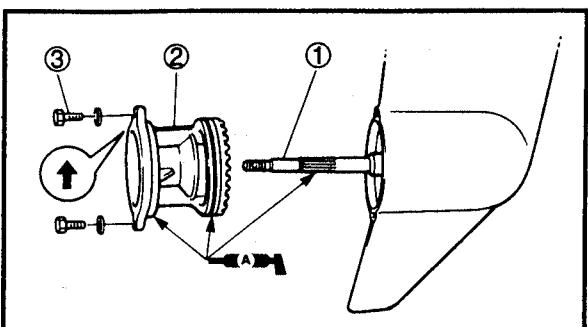
- Forward gear complete ①

LOWR**LOWER UNIT****5. Install:**

- Circlip ①

**6. Install:**

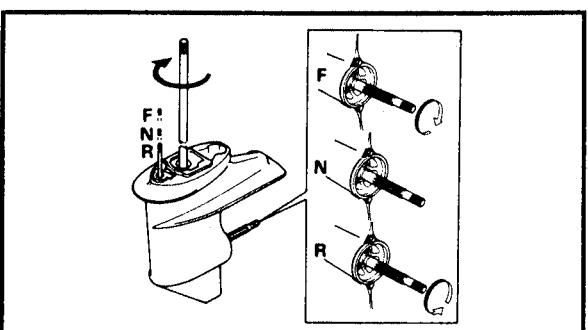
- Drive shaft ①
- Pinion gear shim ②
- Pinion gear ③
- Circlip ④

**7. Install:**

- Propeller shaft complete ①
- Reverse gear complete ②
- Bolt ③

NOTE: _____

Face the arrow mark "↑" upward.

**8. Check:**

- Shift cam operation
- Rough operation → Repair.

NOTE: _____

Check that the dog clutch shifts to "Forward", "Neutral" and "Reverse" correctly.

Backlash measurement**NOTE:** _____

- Both forward and reverse gear backlash should be measured.
- If both the forward and reverse gear backlash are larger than specified, the pinion may be too high.

LOWR**LOWER UNIT**

- If both the forward and reverse gear backlash are smaller than specified, the pinion may be too low.
- If either of these conditions exists, then check the pinion shim selection.

1. Measure:

- Forward gear backlash
Out of specification → Adjust.

**Backlash:**
0.25 ~ 0.75 mm**Measuring steps:**

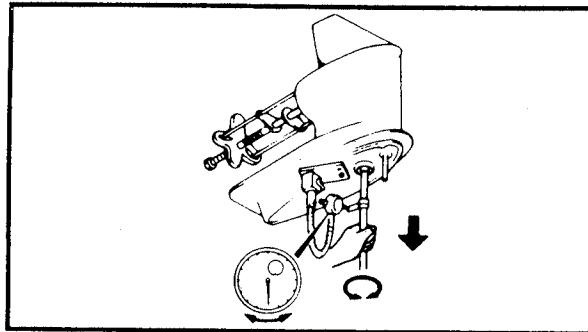
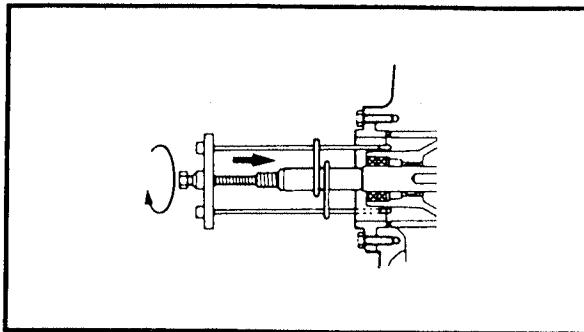
- Place the shift shaft in neutral.
- Load the forward gear with the bearing housing puller on the propeller shaft.

NOTE: _____

Lightly tighten by hand until the pressure of the propeller shaft on the forward gear restricts movement enough to allow backlash measurement.

**Bearing housing puller:**
YB-6234
Universal puller:
YB-6117

- Set the lower unit upside down.
- Attach the backlash indicator on the drive shaft.
- Attach the dial gauge on the gear case, and make the dial gauge stem contact the mark on the indicator.



LOWR**LOWER UNIT**

Dial gauge:
YU-3097/90890-01252
Magnet base:
YU-34481/90890-06705
Backlash indicator:
YB-6265/90890-06265

- While pulling the drive shaft downward, slowly turn the drive shaft clockwise and counterclockwise then measure the backlash when the drive shaft stops at each direction.
- Determine the shims to be added or removed according to the specified.

Less than 0.25 mm	To be decreased by (0.50 – measurement) _____ 1.6
More than 0.75 mm	To be increased by (measurement – 0.50) _____ 1.6

Example:

If measurement = 0.20 mm
Decrease shim thickness by
= $(0.50 - 0.20)/1.6$

$$= 0.30/1.6 = 0.18 \text{ mm}$$

If measurement = 0.82 mm
Increase shim thickness by
= $(0.82 - 0.50)/1.6$

$$= 0.32/1.6 = 0.20 \text{ mm}$$



Available shim thickness:
0.10, 0.12, 0.15, 0.18, 0.30, 0.40
and 0.50 mm

NOTE:

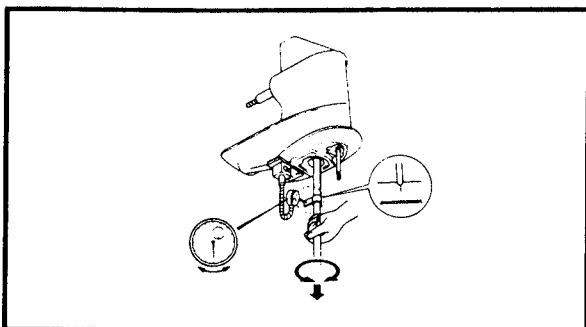
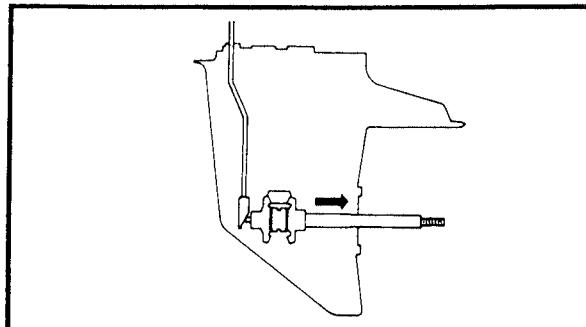
Since the smallest shim available is 0.10 mm, if the measurement is between 0.25 and 0.75 mm do not change the shim.

LOWR**LOWER UNIT****2. Measure:**

- Reverse gear backlash
Out of specification → Adjust.



Backlash:
0.25 ~ 0.75 mm

**Measuring steps:**

- Place the shift shaft in neutral.
- Set the lower unit upside down.
- Attach the backlash indicator on the drive shaft.
- Attach the dial gauge on the gear case, and make the dial gauge stem contact the mark on the indicator.



Dial gauge:
YU-3097/90890-01252
Magnet base:
YU-34481/90890-06705
Backlash indicator:
YB-6265/90890-06265

- While pulling the drive shaft downward, slowly turn the drive shaft clockwise and counterclockwise then measure the backlash when the drive shaft stops at each direction.
- Determine the shims to be added or removed according to the specified.

Less than 0.25 mm	To be decreased by (0.50 – measurement) 1.6
More than 0.75 mm	To be increased by (measurement – 0.50) 1.6

Example:

If measurement = 0.15 mm

Increase shim thickness by
 $= (0.50 - 0.15)/1.6$

$$= 0.35/1.6 = 0.22 \div 0.20 \text{ mm}$$

If measurement = 0.85 mm

Decrease shim thickness by
 $= (0.85 - 0.50)/1.6$

$$= 0.35/1.6 = 0.22 \div 0.20 \text{ mm}$$

LOWR



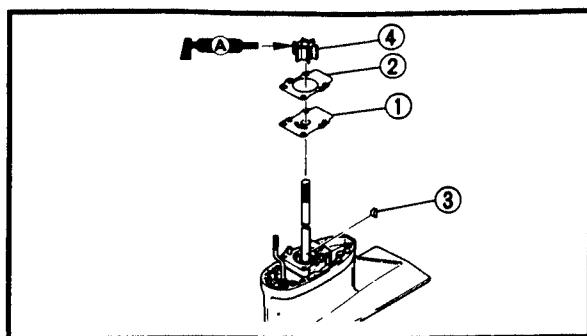
LOWER UNIT



**Available shim thickness:
0.10 mm**

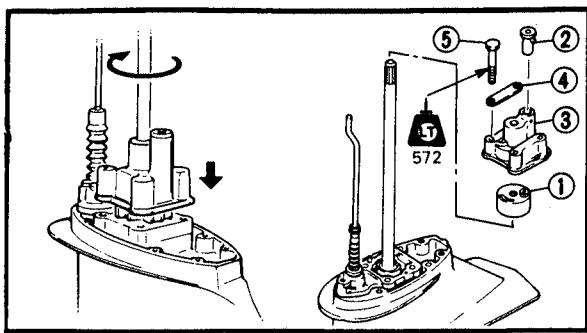
NOTE:

Since the smallest shim available is 0.10 mm, if the measurement is between 0.25 and 0.75 mm do not change the shim.

LOWR**LOWER UNIT****Water pump**

1. Install:

- Outer plate ①
- Gasket ②
- Woodruff key ③
- Impeller ④

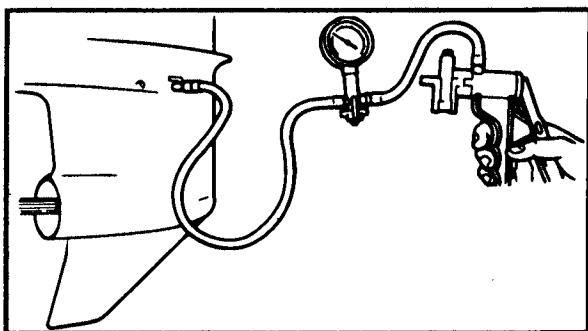


2. Install:

- Insert cartridge ①
- Bushing ②
- Water pump housing ③
- Plate ④
- Bolt ⑤

NOTE:

- Apply the impeller with water resistant grease.
- Align the hole in the water pump housing with the projection in the insert cartridge, when assembling them.
- Turn the drive shaft clockwise, when installing the water pump housing.
- Apply Loctite (572) to the bolts.

**Bolt:**

11 Nm (1.1 m · kg, 8.0 ft · lb)

3. Check:

- Leakage
- Leak → Reinstall.

Checking steps:

- Attach the Mity Vac to the oil level hole.

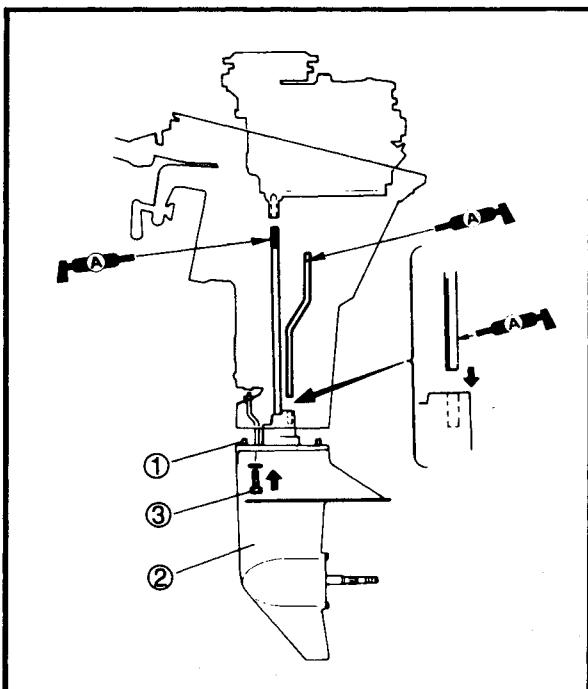
**Mity Vac:**

YB-35956/90890-06756

- Apply the specified pressure.

**Specified pressure:**100 kpa (1.0 kg/cm², 14.2 psi)

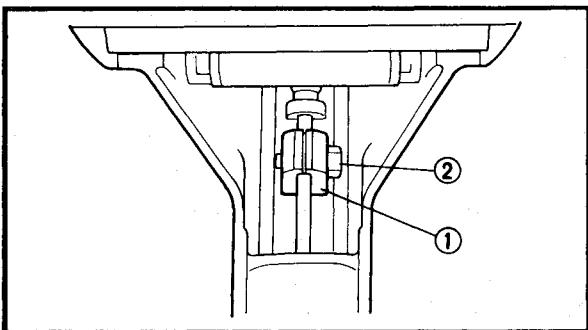
- Check that the pressure is held for 10 seconds.

LOWR**LOWER UNIT****Lower unit****1. Install:**

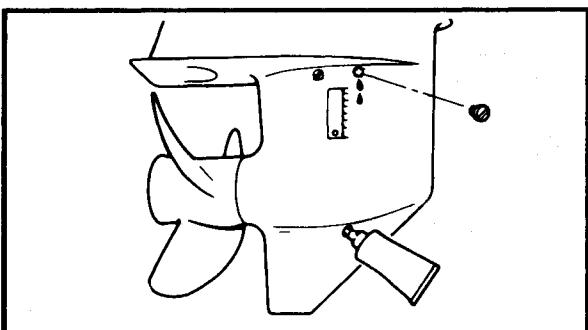
- Dowel pin ①
- Lower unit ②
- Bolt ③

NOTE:

- Shift the gear in reverse.
- Insert the drive shaft into the crankshaft, insert the water tube into the water seal, and insert the shift rod into the upper casting.

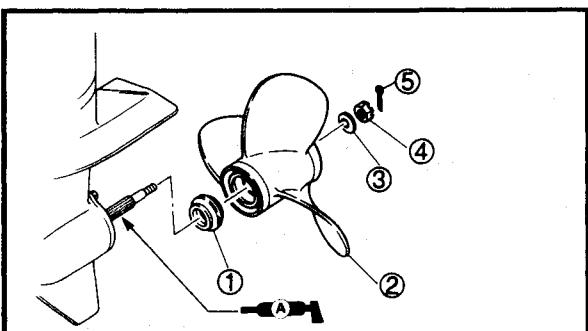
**2. Install:**

- Shift rod connector ①
- Bolt ②

**Bolt:****10 Nm (1.0 m · kg, 7.2 ft · lb)****3. Apply:**

- Gear oil

Refer to page 3-10.

**Propeller****1. Install:**

- Spacer ①
- Propeller ②
- Washer ③
- Nut ④
- Cotter pin ⑤

**Nut:****17 Nm (1.7 m · kg, 12 ft · lb)**



CHAPTER 7

BRACKET UNIT

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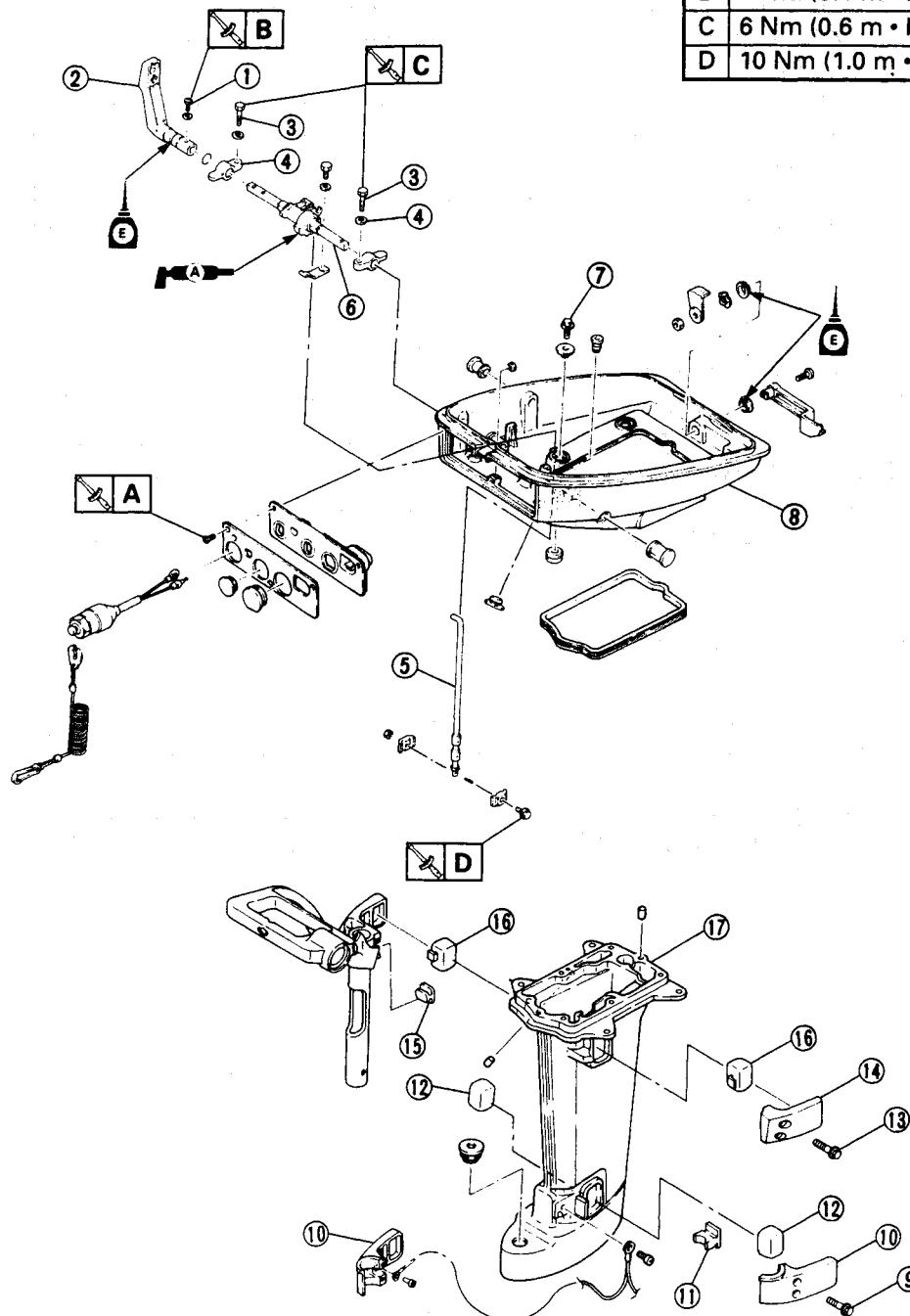
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UPPER CASING AND BOTTOM COWLING

UPPER CASING AND BOTTOM COWLING

PREPARATION FOR REMOVAL

- Remove the power unit.
- Remove the lower unit.



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UPPER CASING AND BOTTOM COWLING

Extent of removal:

- ① Bottom cowling removal
③ Upper casing disassembly

- ② Mount rubber removal

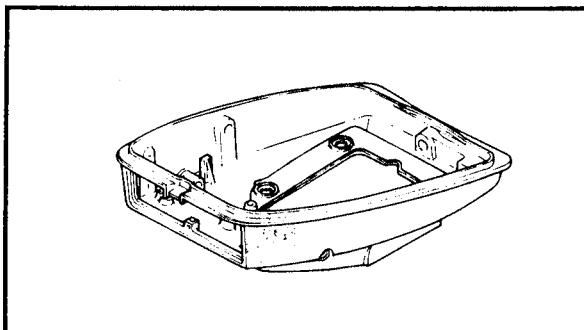
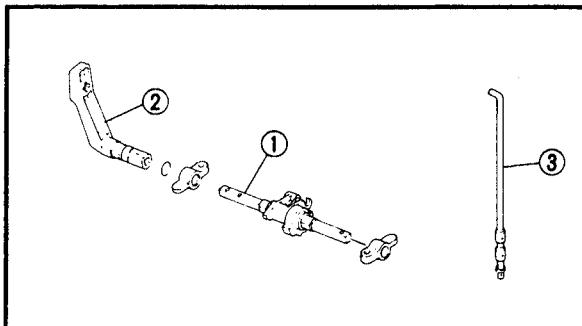
Extent of removal	Order	Part name	Q'ty	Remarks
	1	Screw	1	
	2	Shift handle	1	
	3	Bolt	2	
	4	Bracket	2	
	5	Shift rod	1	
	6	Shift rod lever	1	
	7	Bolt	4	
	8	Bottom cowling	1	
	9	Bolt	2	
	10	Lower mount rubber housing	2	
	11	Lower front mount rubber	1	
	12	Lower side mount rubber	2	
	13	Bolt	2	
	14	Upper mount rubber housing	1	
	15	Upper front mount rubber	1	
	16	Upper side mount rubber	2	
	17	Upper casing	1	

INSPECTION AND REPAIR

Shift mechanism

1. Inspect:

- Shift rod lever ①
 - Shift handle ②
 - Shift rod ③
- Wear/Bend/Damage → Replace.



Bottom cowling

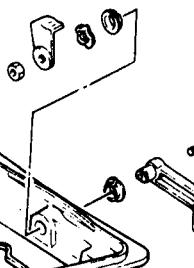
1. Inspect:

- Bottom cowling
- Crack/Damage → Replace.

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UPPER CASING AND BOTTOM COWLING

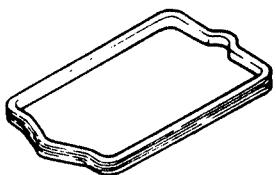


Clamp lever

1. Inspect:

- Clamp lever

Wear/Damage → Replace.

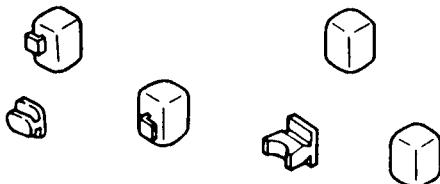


Sealing parts

1. Inspect:

- Rubber seal

Crack/Damage → Replace.

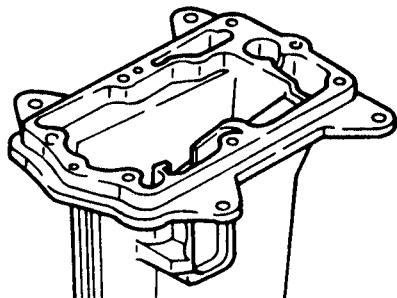


Mount rubber

1. Inspect:

- Mount rubber

Wear/Damage → Replace.



Upper casing

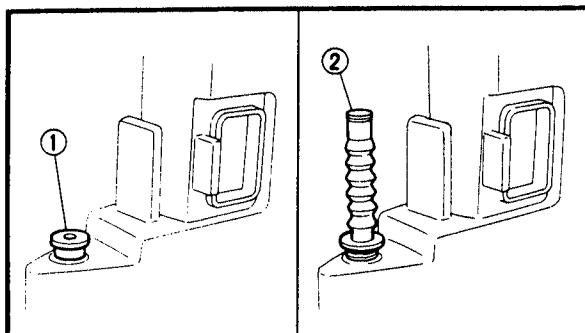
1. Inspect:

- Upper casing

Crack/Damage → Replace.

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UPPER CASING AND BOTTOM COWLING



ASSEMBLY AND INSTALLATION

Upper casing

1. Install:

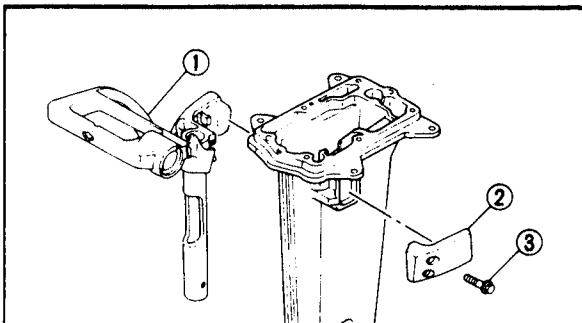
- Grommet ① (short transom model)
- Boot ② (long transom model)

2. Install:

- Upper front mount rubber ①
- Upper side mount rubber ②

NOTE: _____

Hook the upper side mount rubber on to the housing rib.

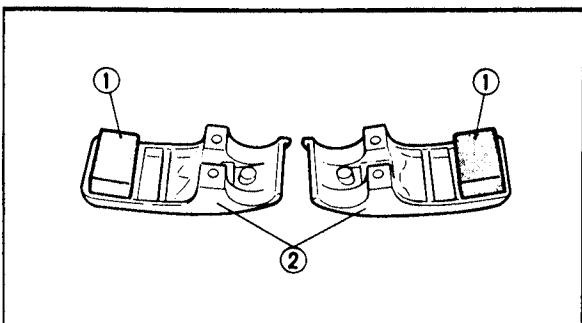


3. Install:

- Steering bracket ①
- Upper mount rubber housing ②
- Bolt ③

NOTE: _____

On the long transom model, the upper casing boot should be fit over the pivot shaft.

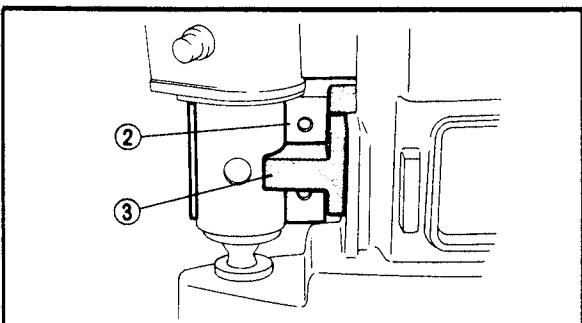


4. Install:

- Lower side mount rubber ①
- Lower mount rubber housing ②
- Lower front mount rubber ③

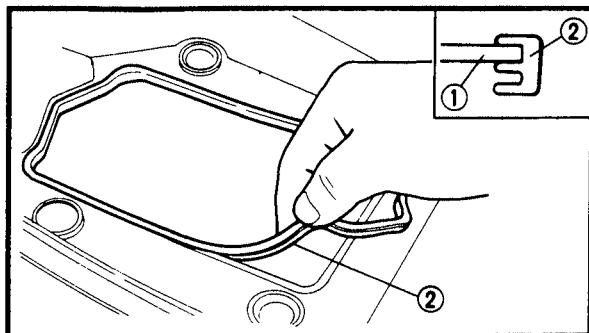
NOTE: _____

The lower front mount rubber should be set between the two bolts.



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UPPER CASING AND BOTTOM COWLING



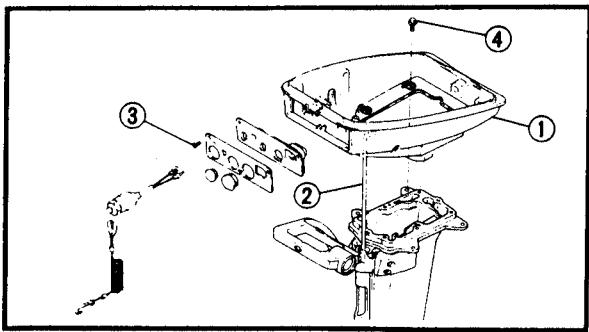
Bottom cowling

1. Install:

- Bottom cowling ①
- Seal rubber ②

NOTE:

The rubber seal should be so installed that its lip faces downward.



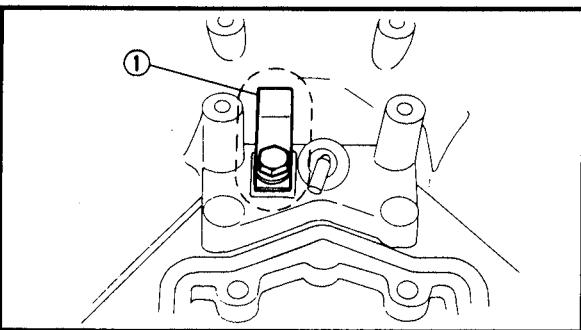
2. Install:

- Bottom cowling ①
- Shift rod ②
- Screw ③
- Bolt ④



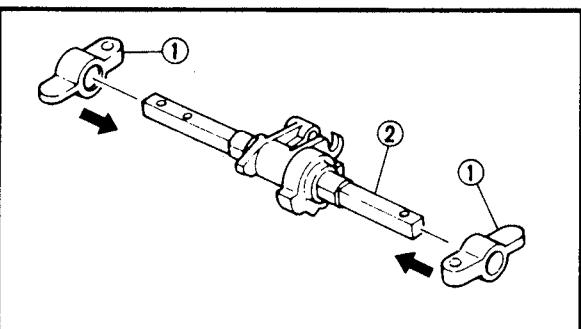
NOTE:

When placing the bottom cowling on the upper casing, use care so that the rubber seal does not come off the bottom cowling.



3. Install:

- Shift spring ①



4. Install:

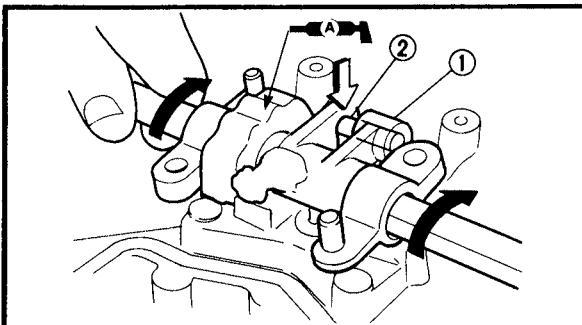
- Bracket ①
- Shift rod lever ②

NOTE:

The brackets should be so positioned that their round corner sides face outward.

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UPPER CASING AND BOTTOM COWLING

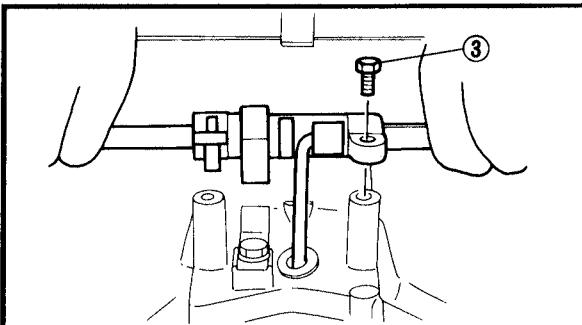


5. Install:

- Shift rod lever ①
- Shift rod ②
- Bolt ③

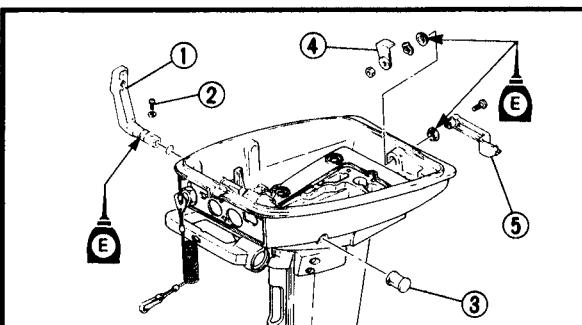
NOTE: _____

- Insert the shift rod into the hole in the other arm.
- Turn the shift rod lever 180° backward.



Bolt:

6 Nm (0.6 m · kg, 4.3 ft · lb)



6. Install:

- Shift handle ①
- Screw ②
- Grommet ③
- Clamp hook ④
- Clamp lever ⑤



Screw:

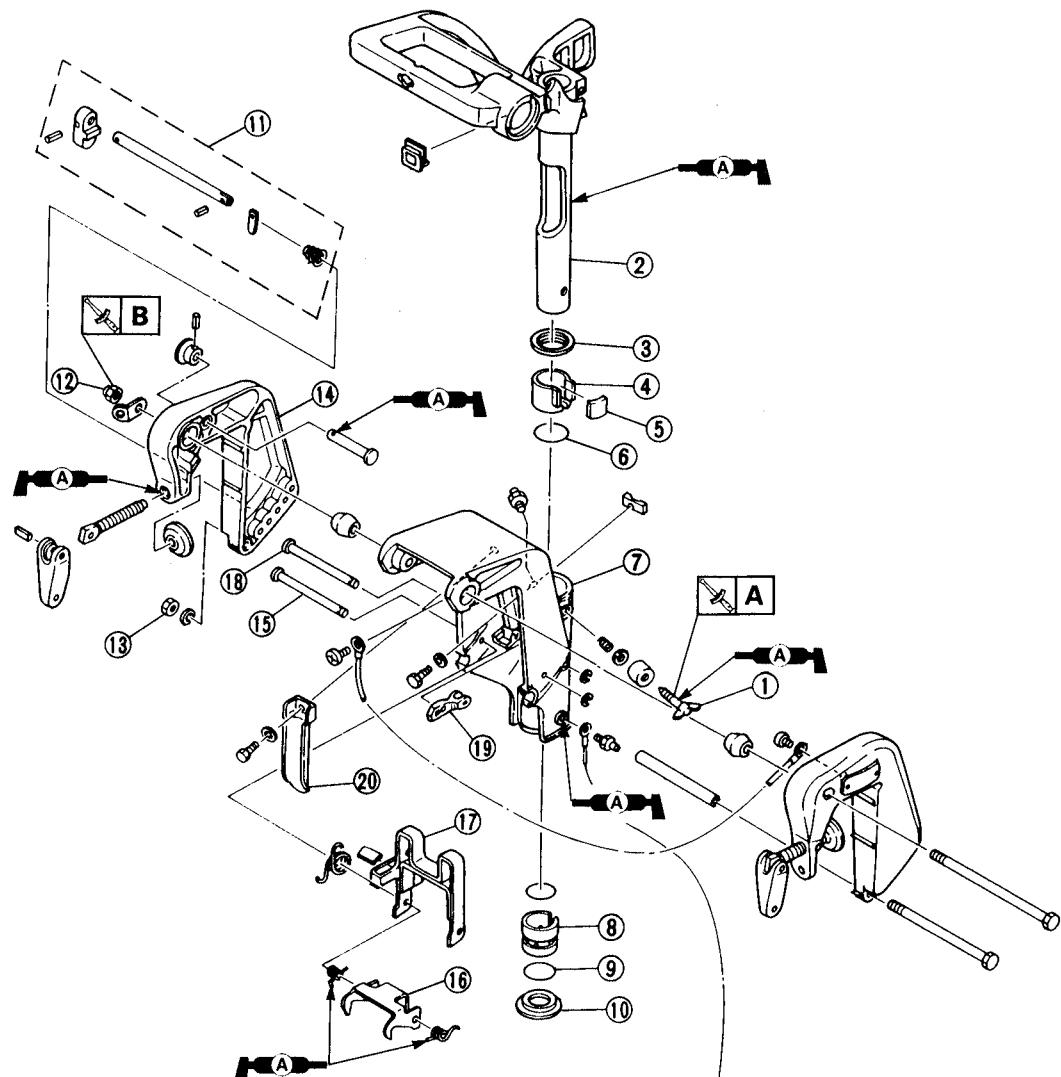
4 Nm (0.4 m · kg, 2.9 ft · lb)

BRACKET UNIT

PREPARATION FOR REMOVAL

- Remove the power unit.
 - Remove the upper casing and bottom cowling.

A	5 Nm (0.5 m • kg, 3.6 ft • lb)
B	7 Nm (0.7 m • kg, 5.1 ft • lb)



BRKT**BRACKET UNIT**

Extent of removal:

① Swivel bracket removal

③ Swivel bracket disassembly

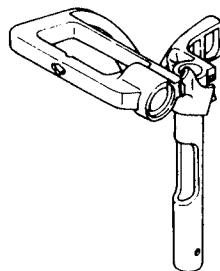
② Clamp bracket removal

Extent of removal	Order	Part name	Q'ty	Remarks
	1	Bolt	1	
	2	Steering bracket	1	
	3	Washer	1	
	4	Bushing	1	
	5	Friction plate	1	
	6	O-ring	1	
	7	Swivel bracket	1	
	8	Bushing	1	
	9	O-ring	1	
	10	Bushing	1	
	11	Tilt pin	1	
	12	Nut	1	
	13	Nut	1	
	14	Clamp bracket	2	
	15	Pin	1	
	16	Tilt plate (inner)	1	
	17	Tilt plate (outer)	1	
	18	Pin	1	
	19	Drive lever	1	
	20	Carrying handle	1	

INSPECTION**Steering bracket and pivot shaft**

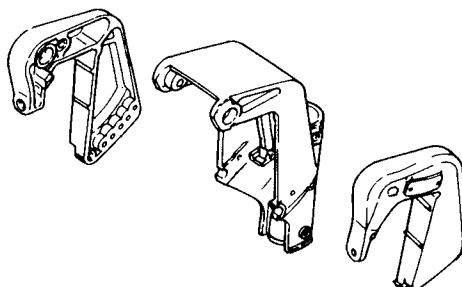
1. Inspect:

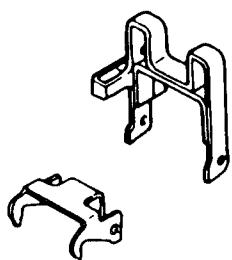
- Steering bracket
 - Pivot shaft
- Crack/Damage → Replace.

**Clamp and swivel bracket**

1. Inspect:

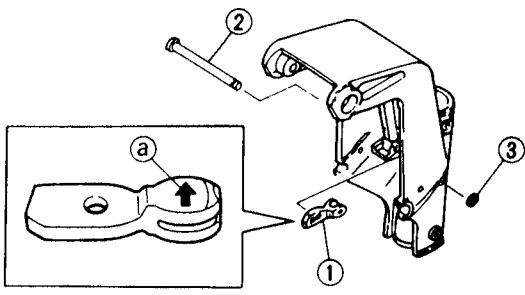
- Clamp bracket
 - Swivel bracket
- Crack/Damage → Replace.



BRKT**BRACKET UNIT****Tilt plate**

1. Inspect:

- Tilt plate
- Crack/Damage → Replace.

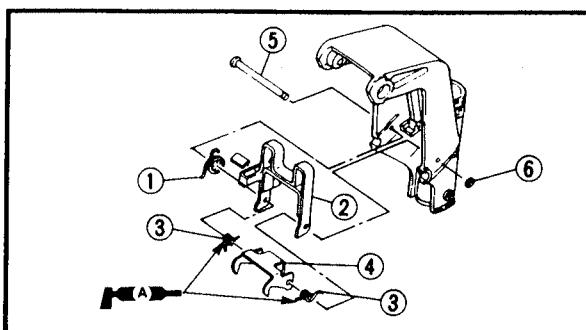
**ASSEMBLY AND INSTALLATION**

1. Install:

- Drive lever ①
- Pin ②
- Crip ③

NOTE: _____

Face the arrow mark ④ upward.

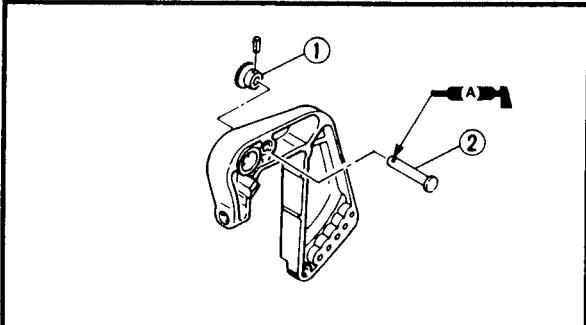


2. Install:

- Spring ①
- Tilt plate ② (outer)
- Spring ③
- Tilt plate ④ (inner)
- Pin ⑤
- Crip ⑥

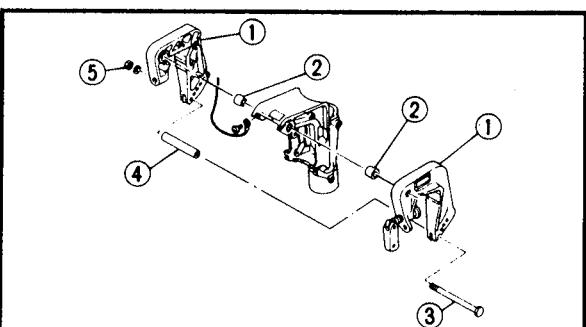
NOTE: _____

Align the holes of the tilt plate (inner) and (outer), after installing the pin.



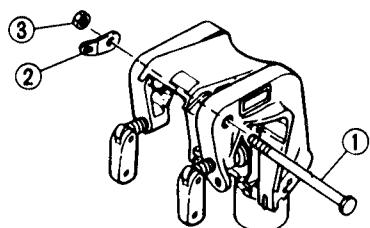
3. Install:

- Bushing ①
- Pin ②



4. Install:

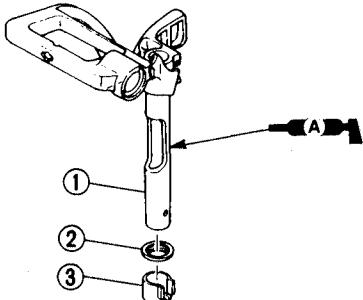
- Clamp bracket ①
- Friction piece ②
- Bolt ③
- Collar ④
- Nut ⑤

BRKT**BRACKET UNIT****5. Install:**

- Bolt ①
- Plate ②
- Nut ③

Nut:

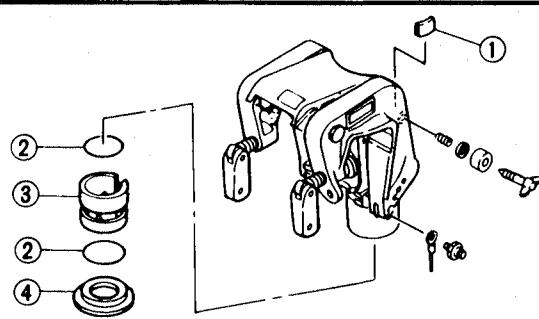
7 Nm (0.7 m · kg, 5.1 ft · lb)

**6. Install:**

- Steering shaft ①
- Washer ②
- Bushing ③

NOTE: _____

Apply water resistant grease to steering shaft.

**7. Install:**

- Friction piece ①
- O-ring ②
- Bushing ③
- Bushing ④

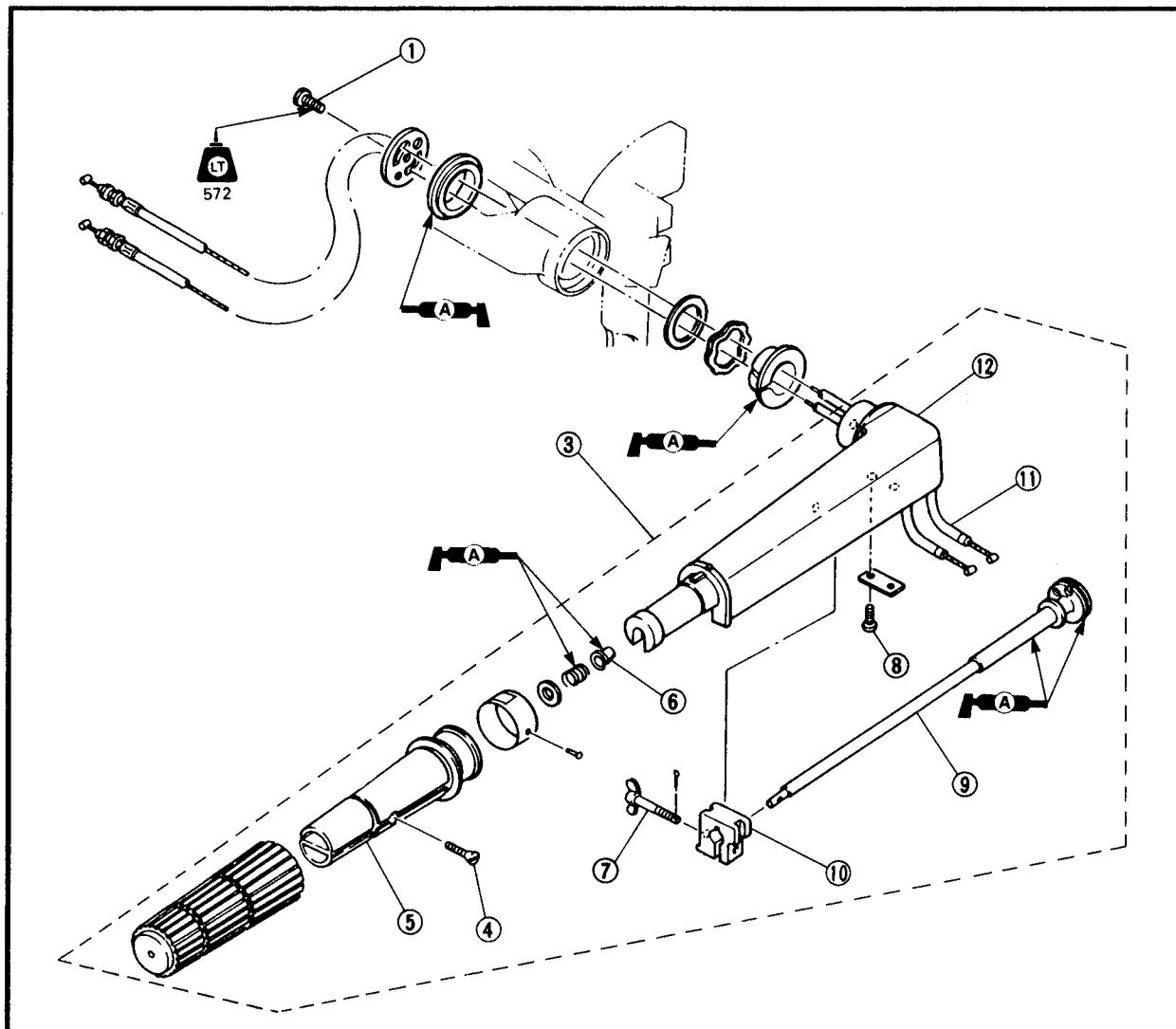
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STEERING HANDLE

**STEERING HANDLE
PREPARATION FOR REMOVAL**

- Remove the carburetor.



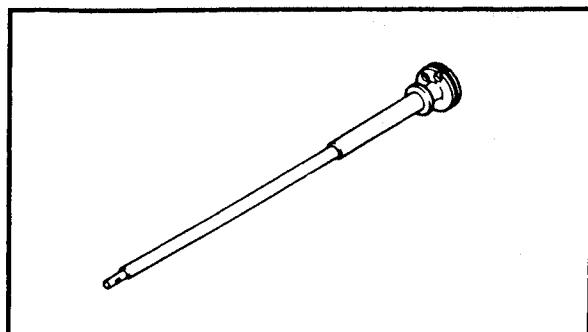
Extent of removal: ① Steering handle removal ② Steering handle disassembly

Extent of removal	Order	Part name	Q'ty	Remarks
①	1	Bolt	1	
	2	Bushing	1	
	3	Steering handle assembly	1	
	4	Screw	1	
	5	Steering grip	1	
②	6	Bushing	1	
	7	Screw	1	
	8	Screw	2	
	9	Throttle shaft	1	
	10	Friction piece	1	
	11	Throttle cable	2	
	12	Steering handle	1	

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STEERING HANDLE



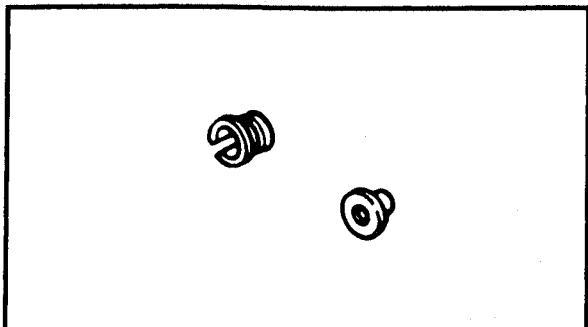
INSPECTION

Throttle shaft

1. Inspect:

- Throttle shaft

Wear/Crack/Damage → Replace.

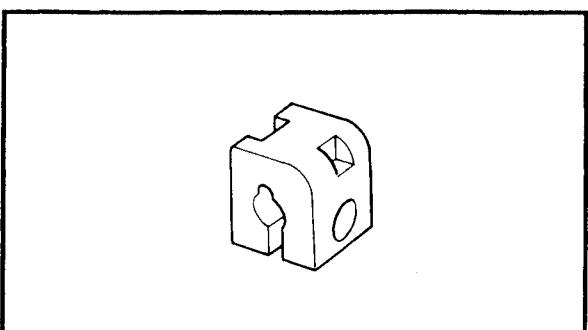


Bushing

1. Inspect:

- Bushing

Wear/Crack/Damage → Replace.

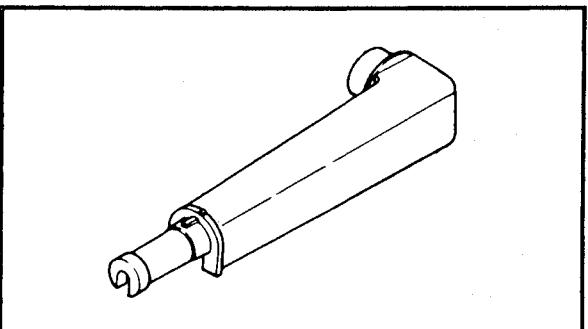


Friction piece

1. Inspect:

- Friction piece

Wear/Crack/Damage → Replace.



Steering handle

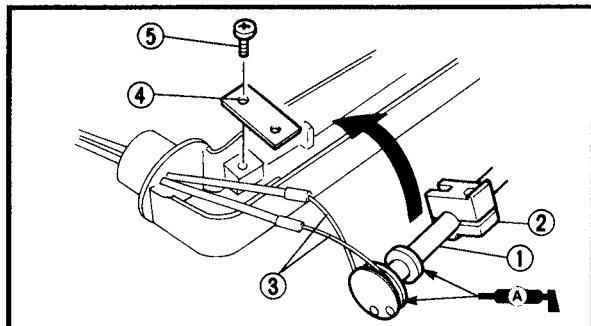
1. Inspect:

- Steering handle

Wear/Crack/Damage → Replace.

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STEERING HANDLE

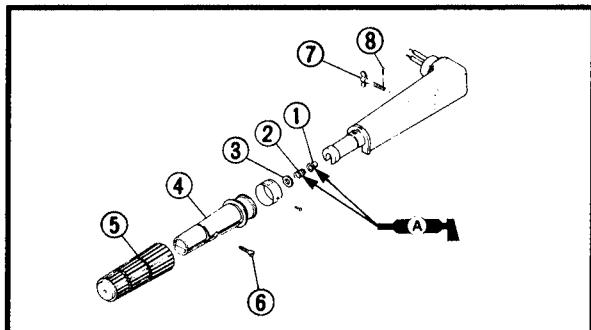


ASSEMBLY AND INSTALLATION

Steering handle

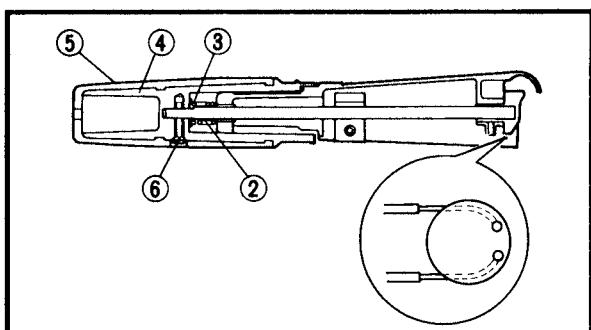
1. Install:

- Throttle shaft ①
- Friction ②
- Throttle wire ③
- Plate ④
- Screw ⑤



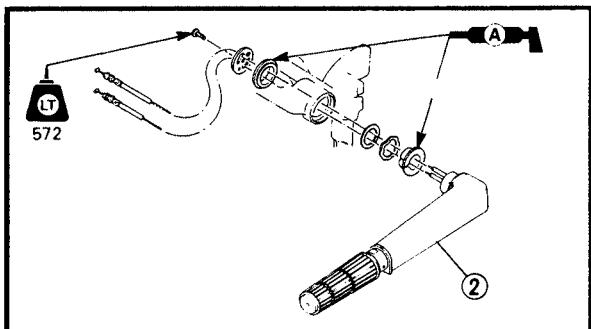
2. Install:

- Bushing ①
- Spring ②
- Washer ③
- Steering grip ④
- Handle grip ⑤
- Screw ⑥
- Screw ⑦
- Pin ⑧



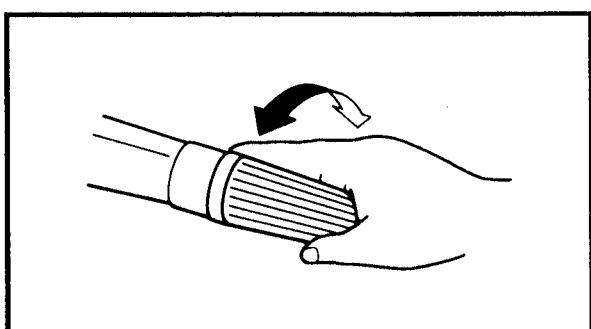
3. Install:

- Bushing ①
- Steering handle assembly ②
- Plate ③
- Wave washer ④
- Bushing ⑤
- Cover ⑥
- Bolt ⑦



4. Check:

- Steering handle operation
Rough operation → Repair.

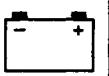




CHAPTER 8

ELECTRICAL SYSTEM

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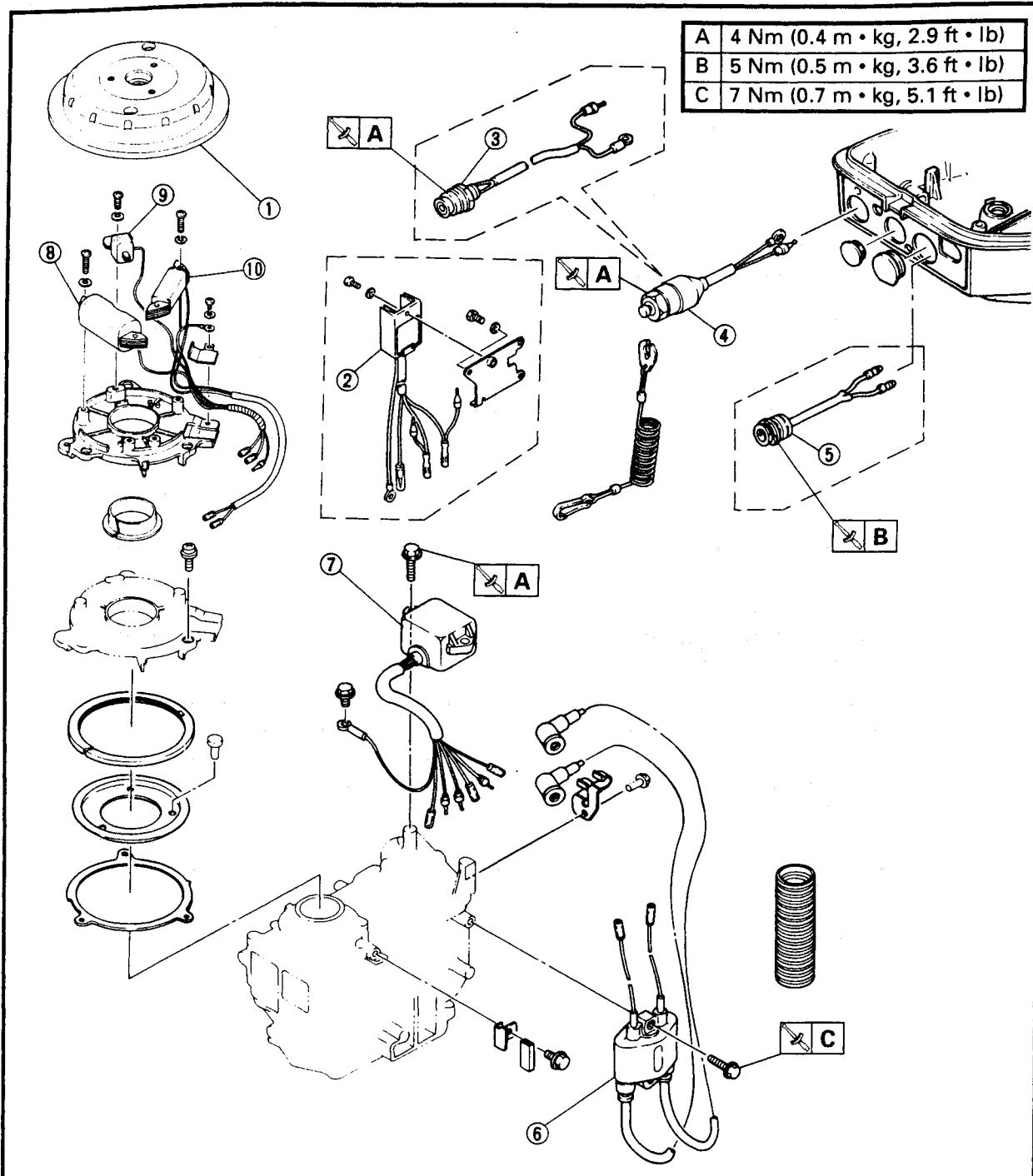
ELECTRICAL COMPONENTS

6CM	<input checked="" type="checkbox"/>	6CEM	
8CM	<input checked="" type="checkbox"/>	8CEM	

- ① C.D.I. magneto
- ② Rectifier regulator*¹
- ③ Stop switch*²
- ④ Engine stop switch
- ⑤ 2P connector*¹
- ⑥ Ignition coil

- ⑦ C.D.I. unit
- ⑧ Charge coil
- ⑨ Pulser coil
- ⑩ Lighting coil
- *¹ For Europe model only
- *² It differs on specification.

A	4 Nm (0.4 m · kg, 2.9 ft · lb)
B	5 Nm (0.5 m · kg, 3.6 ft · lb)
C	7 Nm (0.7 m · kg, 5.1 ft · lb)



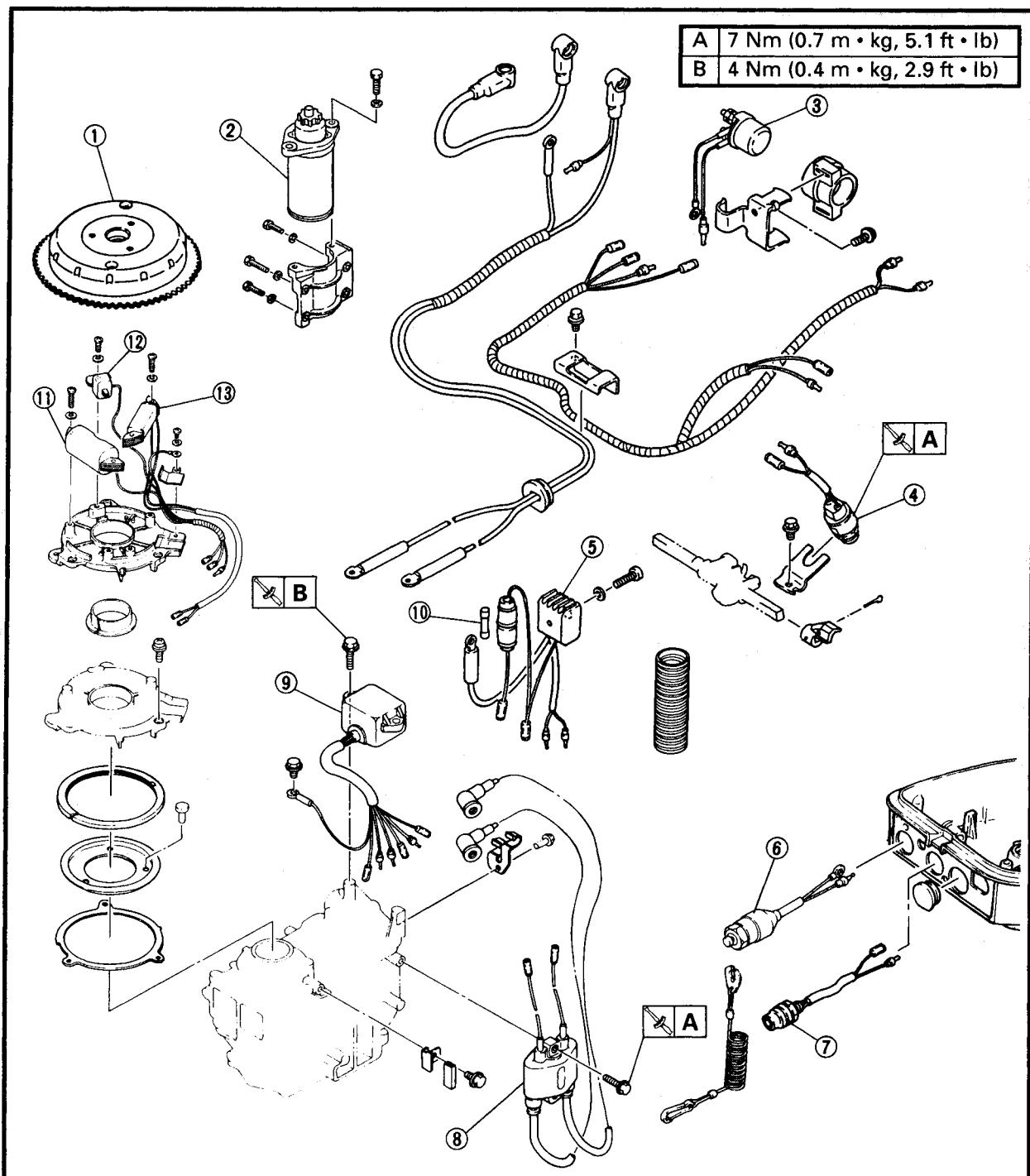


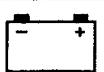
6CM	6CEM	✓
8CM	8CEM	✓

- ① C.D.I. magneto
- ② Starting motor
- ③ Starter relay
- ④ Neutral switch
- ⑤ Rectifier

- ⑥ Engine stop switch
- ⑦ Starter switch
- ⑧ Ignition coil
- ⑨ C.D.I. unit
- ⑩ Fuse

- ⑪ Charge coil
- ⑫ Pulser coil
- ⑬ Lighting coil



ELEC**WIRING DIAGRAM**

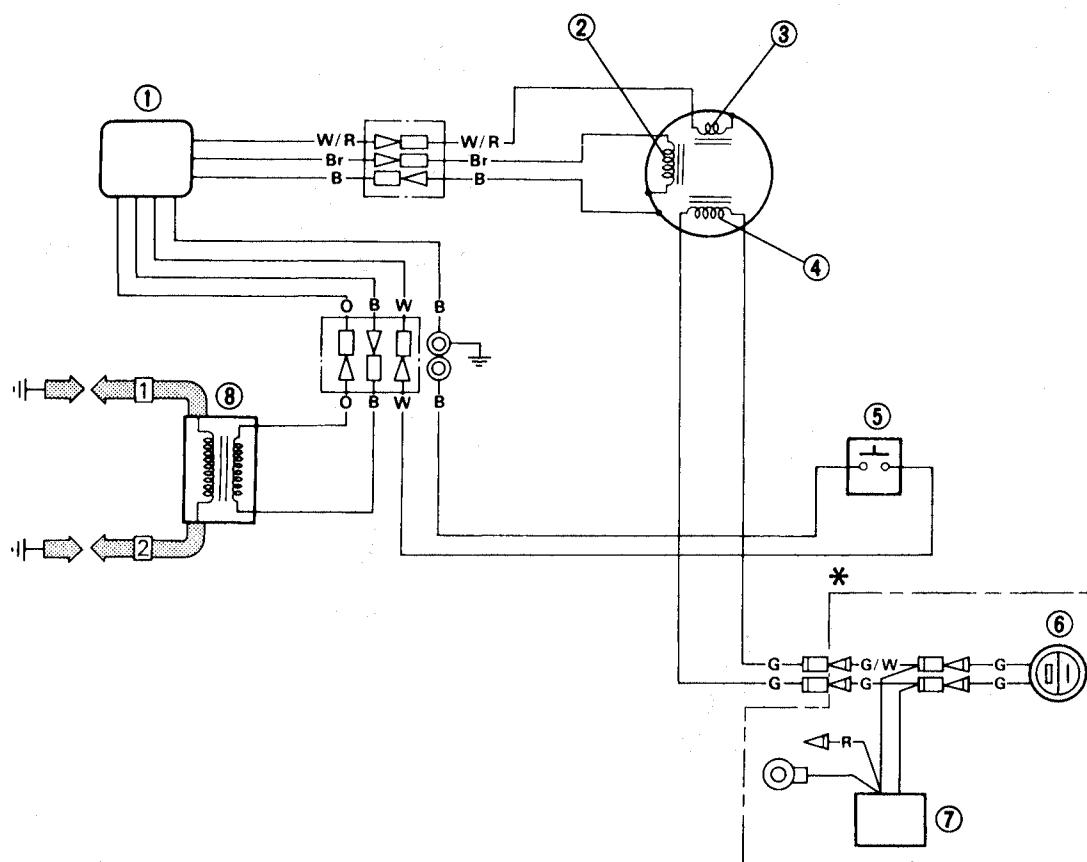
6CM	✓	6CEM	
8CM	✓	8CEM	

- ① C.D.I. unit
- ② Charge coil
- ③ Pulser coil
- ④ Lighting coil
- ⑤ Engine stop switch/
Stop switch

- ⑥ 2P connector*
- ⑦ Rectifier regulator*
- ⑧ Ignition coil

* For Europe model

B : Black
Br : Brown
G : Green
G/W : Green/White
O : Orange
R : Red
W : White
W/R : White/Red



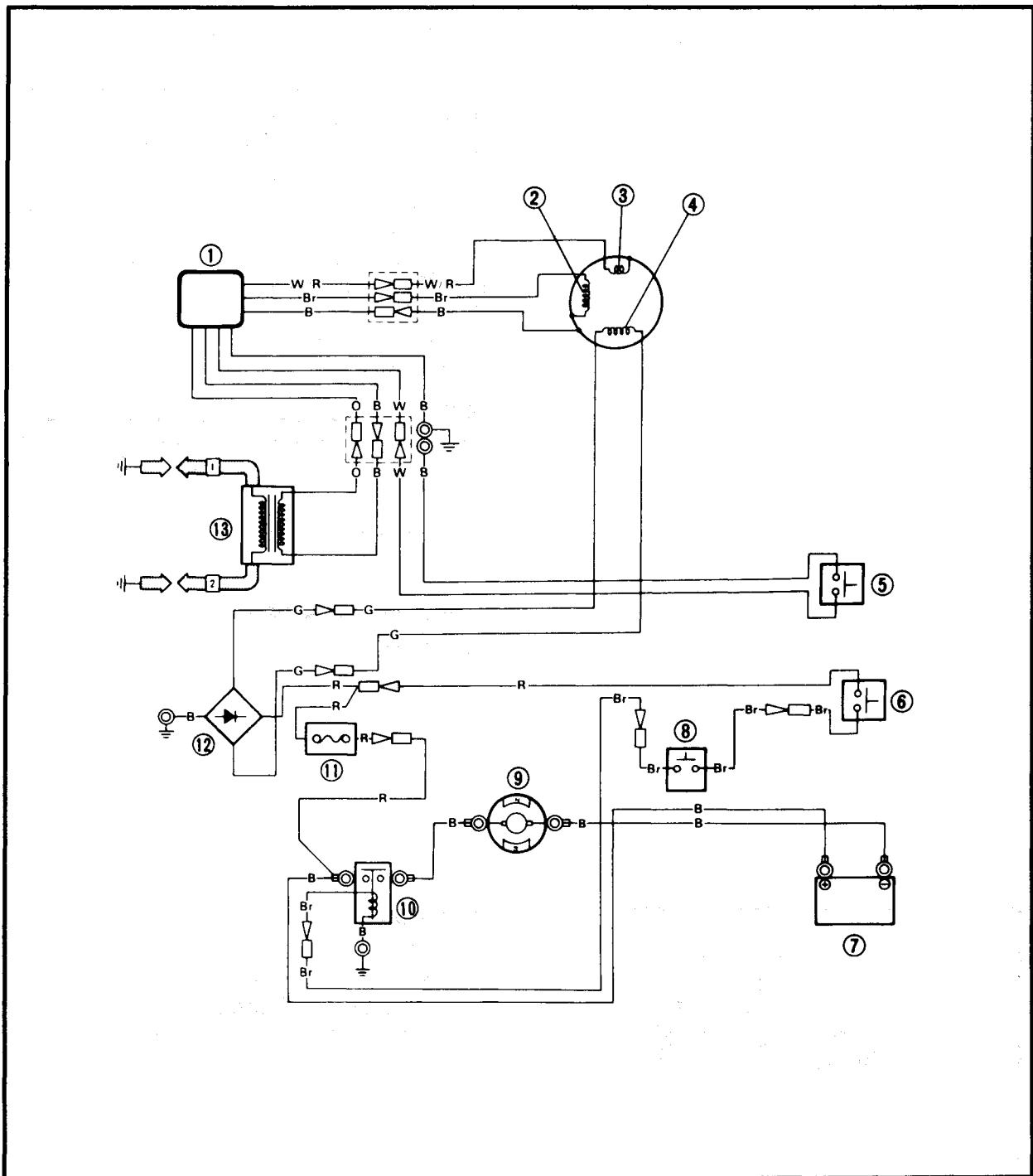
ELEC**WIRING DIAGRAM**

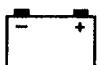
6CM	6CEM	✓
8CM	8CEM	✓

- ① C.D.I. unit
- ② Charge coil
- ③ Pulser coil
- ④ Lighting coil
- ⑤ Engine stop switch
- ⑥ Starter switch
- ⑦ Battery

- ⑧ Neutral switch
- ⑨ Starter motor
- ⑩ Starter relay
- ⑪ Fuse
- ⑫ Rectifier
- ⑬ Ignition coil

B : Black
Br : Brown
G : Green
G/W : Green/White
O : Orange
R : Red
W : White
W/R : White/Red





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.

Low resistance measurement

When measuring the resistance of $10\ \Omega$ 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

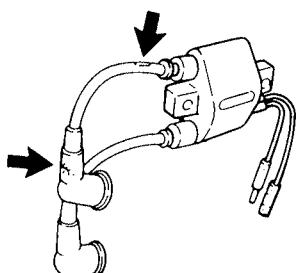
NOTE:

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

IGNITION SYSTEM

Spark plug

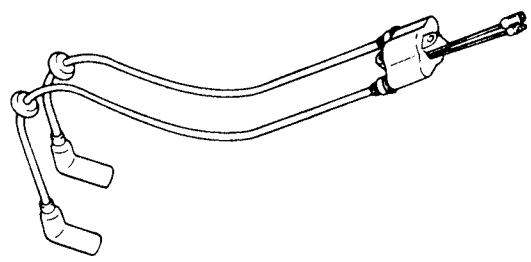
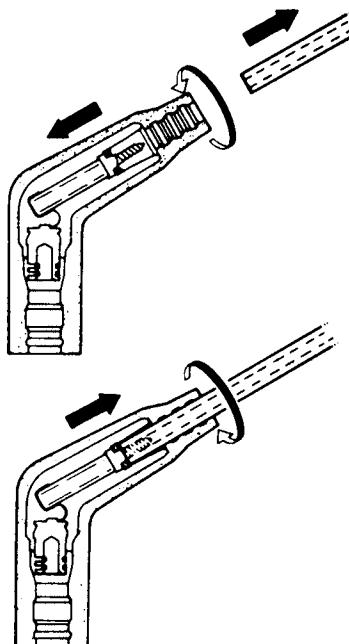
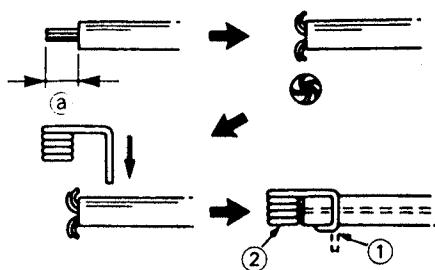
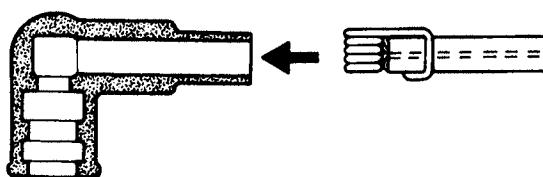
Refer to page 3-11.



Spark plug cap

1. Inspect:

- Spark plug cap
- Loosen → Tighten.
Crack/Damage → Replace.

**Replacement steps:****(Except for Canada and Europe)**

- Remove the spark-plug cap by pulling the cap, and remove the plug-cap spring from the high-tension cable.
- Cut about distance ② off the end of the high-tension cable.



Distance ②:
5 mm (0.2 in)

- Referring to the diagram, strip about 5 mm (0.2 in) of the insulation off the end of the high-tension cable, and fit the plug cap spring.
- Push the cap spring into the plug cap.

- ① Bend
② Contact

Replacement steps:**(For Canada and Europe)**

- Remove the spark-plug cap by turning the cap counterclockwise.

NOTE: _____

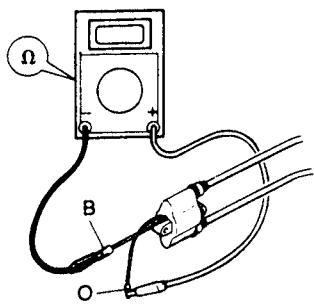
Avoid removing the plug cap by pulling the wire hard. Remove it by turning in and out.

- Install the plug cap by turning the cap clockwise until it stops.

Ignition coil

1. Inspect:

- High tension cord
Crack/Damage → Replace.

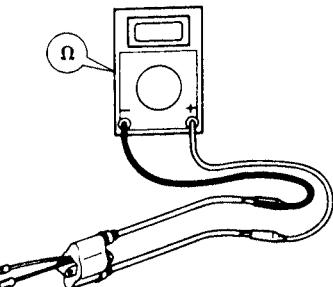


2. Measure:

- Primary coil resistance
Out of specification → Replace.

Primary coil resistance:

Orange (O) - Black (B)
0.25 ~ 0.35 Ω at 20°C (68°F)

**NOTE:**

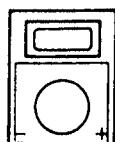
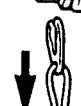
When measuring the resistance of 10 Ω or less using the digital tester, the correct measurement cannot be obtained. Refer to "Lower resistance measurement".

3. Measure:

- Secondary coil resistance
Out of specification → Replace.

Secondary coil resistance:

High tension cord
6.8 ~ 10.2 kΩ at 20°C (68°F)

**Engine stop switch**

1. Check:

- Continuity
Out of specification → Replace.

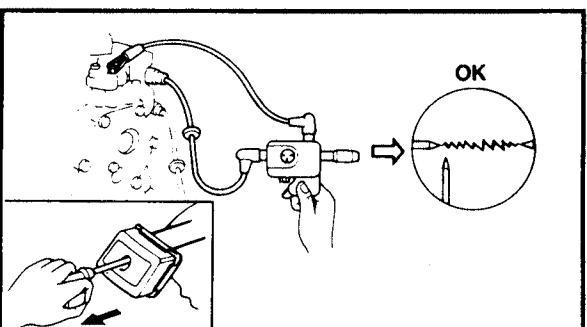
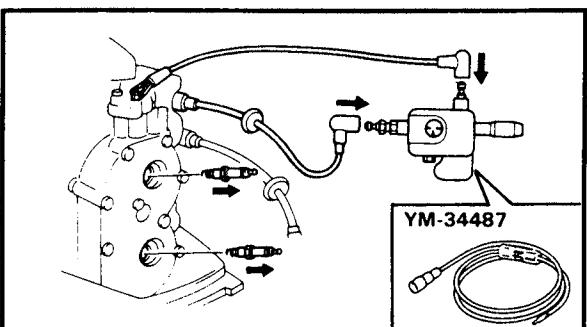
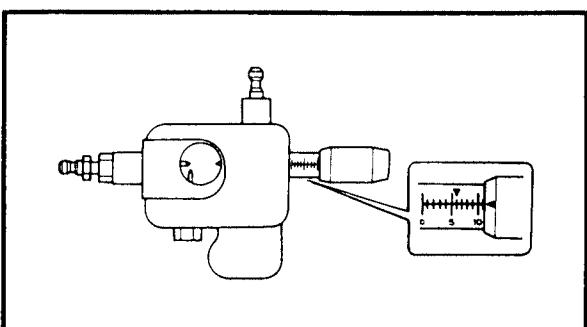
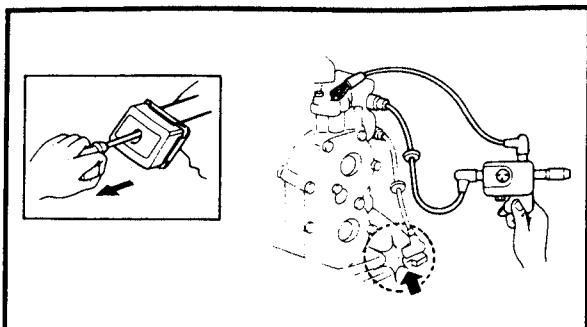
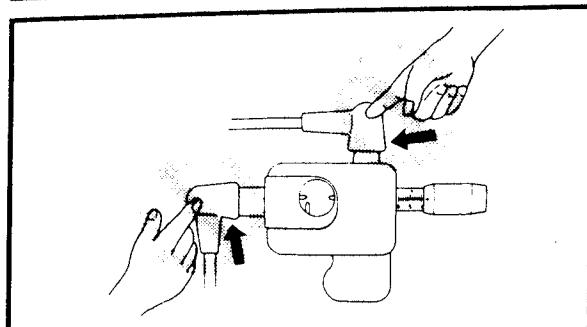
	Color: White - Black
Remove the lock-plate	Continuity
Install the lock-plate	Discontinuity
Push the button	Continuity

Stop switch

1. Inspect:

- Continuity
Out of specification → Replace.

	Color: White - Black
Free	Discontinuity
Push the button	Continuity



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.

Checking steps:

- Adjust the spark gap to the specified by turning the adjust knob.

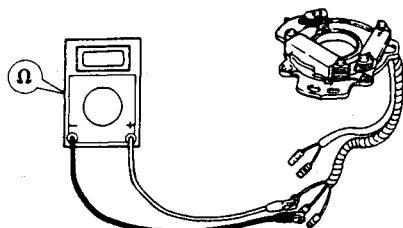
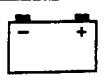


Spark gap tester:
YM-34487/90890-06754



Spark gap:
9 mm (0.35 in)

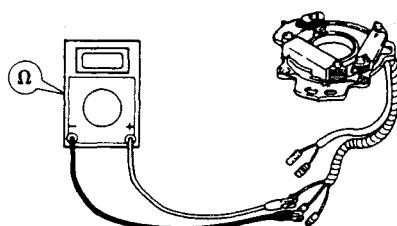
- Connect the spark-plug cap to the spark gap tester.
- Remove the spark plugs from the engine.
- Cranking the engine and check sparks of ignition system seen through discharge window.

**Charge coil**

1. Measure:

- Charge coil resistance
Out of specification → Replace.

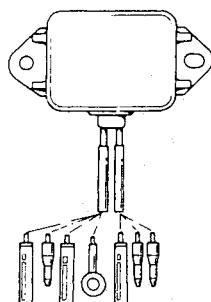
Charge coil resistance:
Brown (Br) - Black (B)
81 ~ 99 Ω at 20° C (68° F)

**Pulser coil**

1. Measure:

- Pulser coil resistance
Out of specification → Replace.

Pulser coil resistance:
White/Red (W/R) - Black (B)
92 ~ 112 Ω at 20 °C (68°F)

**C.D.I. unit**

1. Measure:

- C.D.I. unit resistance
Out of specification → Replace.

NOTE:

- Digital tester can not be used for this inspection. Use analogue tester.
- C.D.I. resistance values will vary from meter to meter, especially with electronic digital meters. For some testers, polarity of leads is reversed.

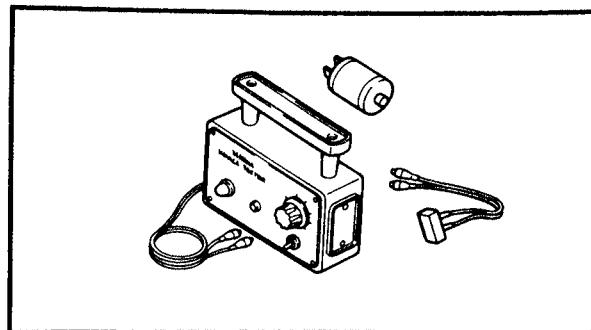
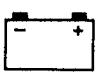
B	: Black
Br	: Brown
G	: Green
O	: Orange
W	: White
W/R	: White/Red

Unit: KΩ

(-)	(+)	W	B	Br	W/R	O
W			∞	∞	∞	∞
B		∞		7.5 ~ 11.3	∞	•
Br		∞	63.2 ~ 94.8		∞	•
W/R		8.8 ~ 13.2	14.4 ~ 21.6	30.4 ~ 45.6		•
O		∞	∞	∞	∞	

• : Needle swings once and returns to home position.

∞ : Discontinuity

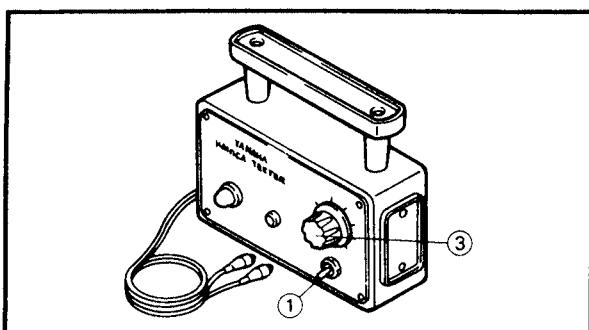
**C.D.I. system****NOTE:**

- If there is no spark, or the spark is weak, continue with the C.D.I. test.
- If a good spark is obtained, the problem is not with the C.D.I. system, but possibly the spark plug or other component is defective.
- Use the following special tool in this inspection.



C.D.I. tester:
YU-91022-B

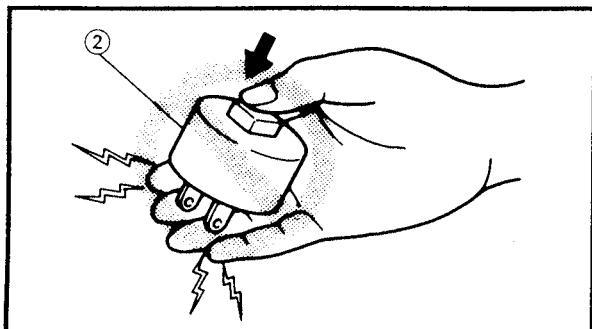
- If lamp does not light, check tester batteries. If they are installed correctly and are good, check the clip leads for faulty connections. If no fault can be found, refer to the warranty statement for instructions for sending the tester back to Electro-Specialties, inc.

**⚠ WARNING**

While taking C.D.I. unit check be careful not to touch any connection of lead wires of the "C.D.I. tester".

1. Check:

- C.D.I. tester for high scale
No indication → Replace the tester.

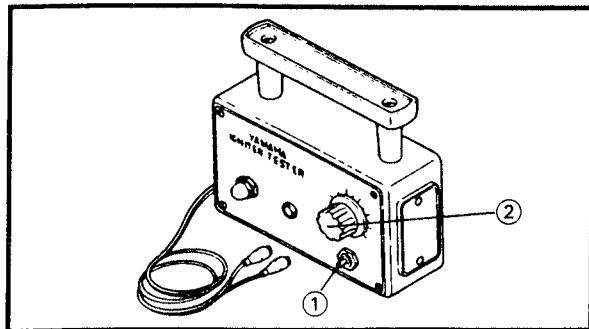
**Checking steps:**

- Place switch (1) in HIGH position.
- Plug the capacitive clip (2) into an electric outlet. (117 VAC for ten seconds)

⚠ WARNING

Do not touch the plug pins on the capacitive clip while plugging it and depressing the button. An electric shock will result.

- Remove the capacitive clip from the outlet.
- Set the tester dial (3) to 50, or below.
- Connect the capacitive clip



Yellow (Y) lead → Capacitive clip N terminal.

Red (R) lead → Capacitive clip P terminal.

- Depress the button on the capacitive clip.
- The indicator lamp on the tester should light

2. Check:

- C.D.I. tester for low scale
No indication → Replace the tester.

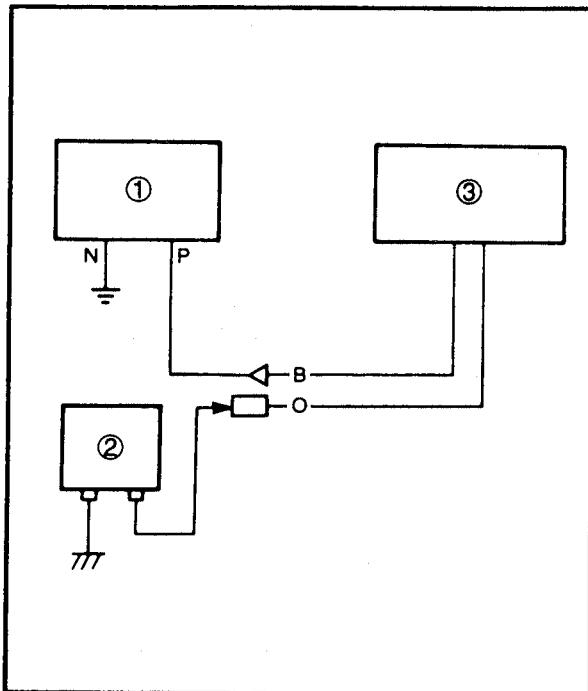
Checking steps:

- Place switch ① in LOW position.
- Set the tester dial ② to 50, or below.
- Connect the 12 V battery.

Red (R) lead → Positive terminal.

Yellow (Y) lead → Negative terminal.

- The indicator lamp on the tester should light.



3. Check:

- C.D.I. unit output (test #1)
No indication → Replace.

Checking steps:

- Disconnect the Black (B) and Orange (O) leads from the ignition coil.
- Remove the spark plugs.
- Connect the C.D.I. tester ① and load coil ② to C.D.I. unit ③ as shown.



C.D.I. tester:

YU-91022-1

Load coil:

YU-91022-3

ELEC**INSPECTION****NOTE:**

In this test, connect the load coil, provided along with the tester, between the C.D.I. unit output and the ground.

- Set the tester switch and dial to specified.

**Range switch:****Dial setting:****H****75**

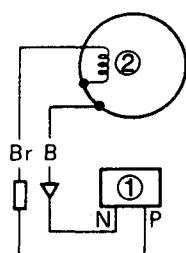
- Cranking the engine.

NOTE:

- The coil output varies greatly cranking speed.
- Cranking the cold engine with the plugs in and a weak battery cannot be found proper readings.

4. Check:

- Charge coil output (test #2)
No indication → Replace.

**Checking steps:**

- Disconnect the Brown (Br) and Black (B) leads from the charge coil.
- Remove the spark plugs.
- Connect the C.D.I. tester ① to charge coil ② as shown.

**C.D.I. tester:
YU-91022-1**

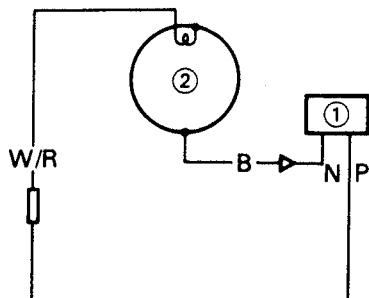
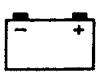
- Set the tester switch and dial to specified.

**Range switch:****Dial setting:****H****80**

- Cranking the engine.

NOTE:

- The coil output varies greatly cranking speed.
- Cranking the cold engine with the plugs in and a weak battery can not be found proper readings.



5. Check:

- Pulser coil output (test #3)
No indication → Replace.

Checking steps:

- Disconnect the White/Red (W/R) and Black (B) leads from the pulser coil.
- Remove the spark plugs.
Connect the C.D.I. tester ① to pulser coil ② as shown.

**C.D.I. tester:**
YU-91022-1

- Set the tester switch and dial to specified.

**Range switch:**

L

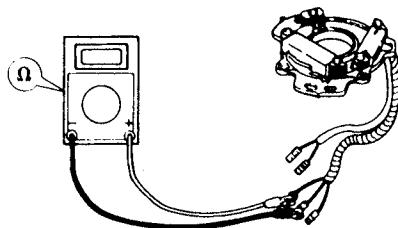
Dial setting:

80

- Cranking the engine.

NOTE:

- The coil output varies greatly cranking speed.
- Cranking the cold engine with the plugs in and a weak battery can not be found proper readings.

**LIGHTING SYSTEM****Lighting coil**

1. Measure:

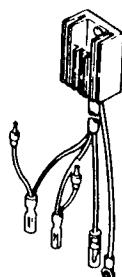
- Lighting coil resistance
Out of specification → Replace.



Lighting coil resistance:
Green (G) - Green (G)
0.36 ~ 0.44 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".

**Rectifier regulator**

6CM	✓	6CEM		(For Europe model)
8CM	✓	8CEM		

1. Check:

- Continuity
Out of specification → Replace.

NOTE:

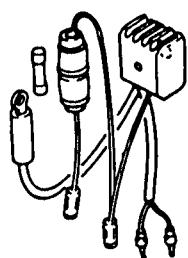
Digital tester can not be used for this inspection. Use the analogue tester.

B :Black
G :Green
G/W :Green/White
R :Red

⊖	⊕	R	G	G/W	B
R			∞	∞	∞
G	○			∞	∞
G/W	○	∞			∞
B	○	○	○	○	

○ : Continuity

∞ : Discontinuity

ELEC**INSPECTION****Rectifier**

6CM	6CEM	✓
8CM	8CEM	✓

1. Check:

- Continuity

Out of specification → Replace.

NOTE:

Digital tester can not be used for this inspection. Use the analogue tester.

B :Black

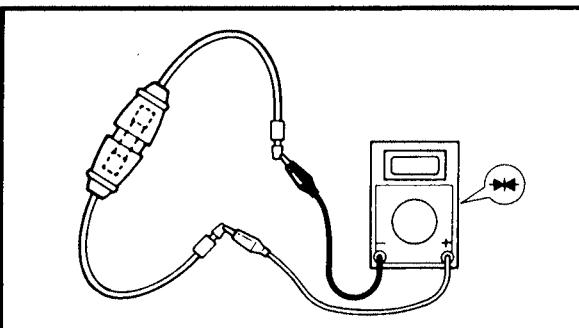
G1,2 :Green

R :Red

(-) (+)	R	G1	G2	B
R		∞	∞	∞
G1	○		∞	∞
G2	○	∞		∞
B	○	○	○	

○ : Continuity

∞ : Discontinuity

**ELECTRIC STARTING SYSTEM**

6CM	6CEM	✓
8CM	8CEM	✓

Fuse

1. Check:

- Fuse

Blown → Replace.

	Fuse rating:
	10 A

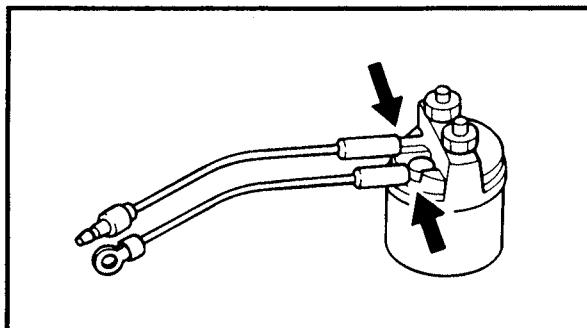
Starter relay

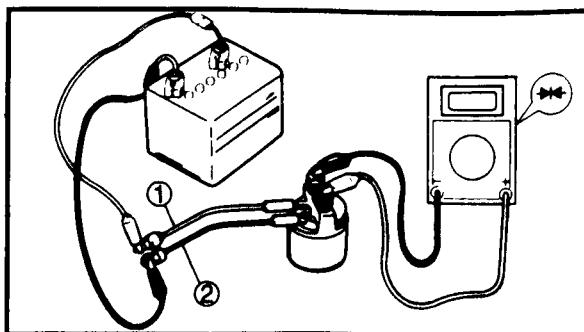
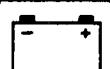
1. Inspect:

- Brown lead terminal

- Black lead terminal

Loose → Tighten.





2. Check:

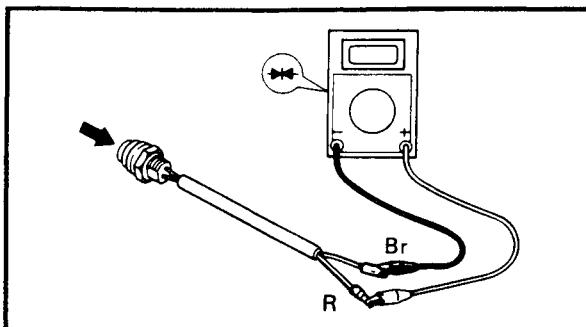
- Relay operation
Does not function → Replace.

Checking steps:

- Connect a tester ($\Omega \times 1$) between the terminals of the starter relay as shown.
- Connect a 12 V battery.

- ① Brown lead → Positive terminal
② Black lead → Negative terminal

- Check that there is continuity between the starter relay terminals.



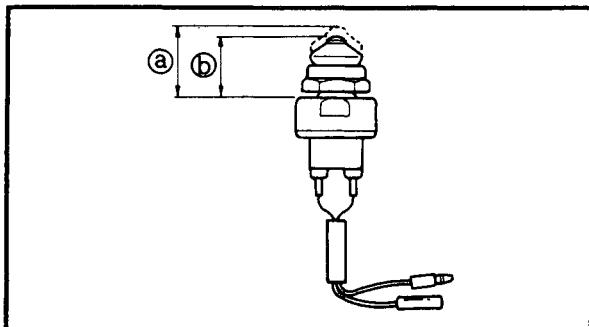
Starter switch

1. Inspect:

- Continuity

Out of specification → Replace.

		Color: Red - Brown
Free		Discontinuity
Push the button		Continuity



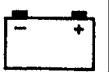
Neutral switch

1. Inspect:

- Continuity

Out of specification → Replace.

	Distance	Color: Brown - Brown
Free (a)	19.6 ~ 20.5 mm (0.77 ~ 0.81 in)	Discontinuity
Push (b)	18.5 ~ 19.5 mm (0.73 ~ 0.77 in)	Continuity

ELEC**STARTER MOTOR****STARTER MOTOR**

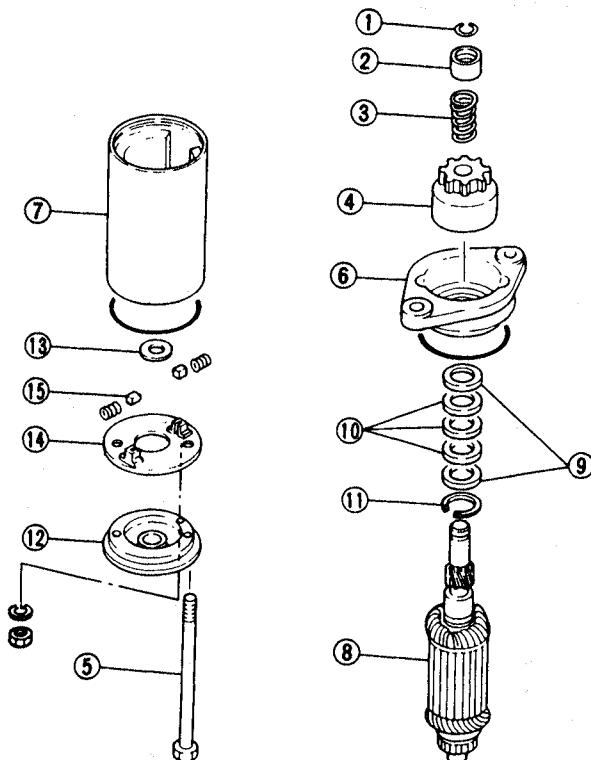
6CM	6CEM	✓
8CM	8CEM	✓

PREPARATION FOR REMOVAL

- Disconnect the battery cables.

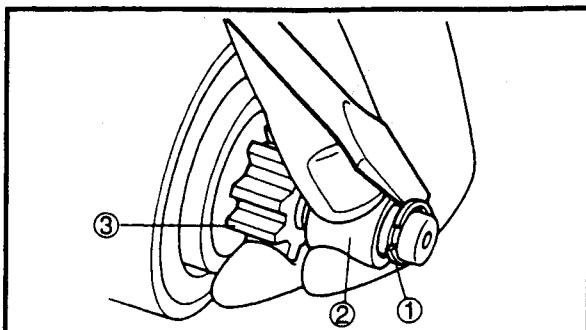
WARNING

To avoid dangers of an electric shock, be sure to disconnect the battery cables from the battery before removing the starter motor.



Extent of removal: ① Starter motor disassembly

Extent of removal	Order	Part name	Q'ty	Remarks
①	1	Clip	1	Refer to "REMOVAL POINTS".
	2	Pinion stopper	1	
	3	Spring	1	
	4	Pinion	1	
	5	Through bolt	2	
	6	Front cover	1	
	7	Stator	1	
	8	Armature assembly	1	
	9	Washer	2	t=0.5 mm
	10	Washer	3	t=0.25 mm
	11	Ring	1	
	12	Rear cover	1	
	13	Washer	1	t=1.0 mm
	14	Brush holder	2	
	15	Brush	2	

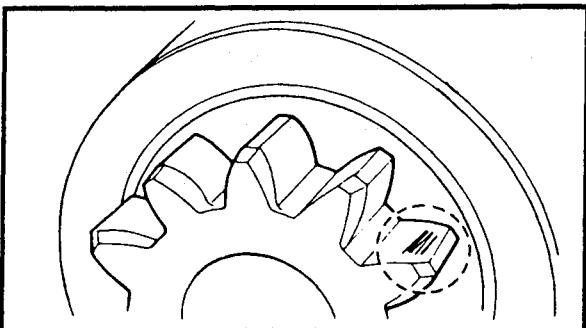
ELEC**STARTER MOTOR****REMOVAL POINTS****Pinion**

1. Remove:

- Clip ①
- Pinion stopper ②
- Pinion ③

NOTE:

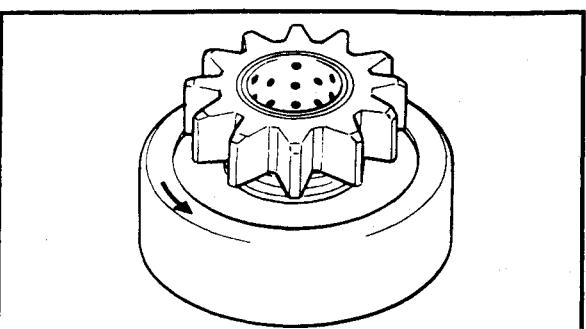
Using a screw-driver, pry off the clip.

**INSPECTION****Pinion**

1. Inspect:

- Pinion teeth

Wear/Damage → Replace.

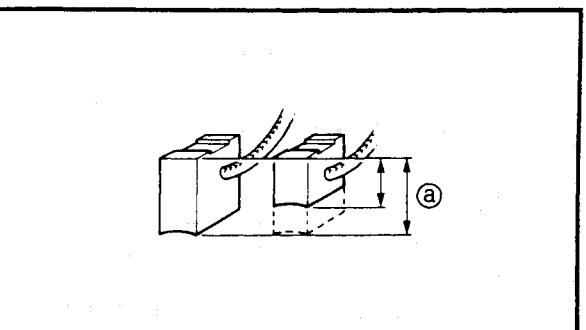


2. Check:

- Clutch movement
- Damage → Replace.

NOTE:

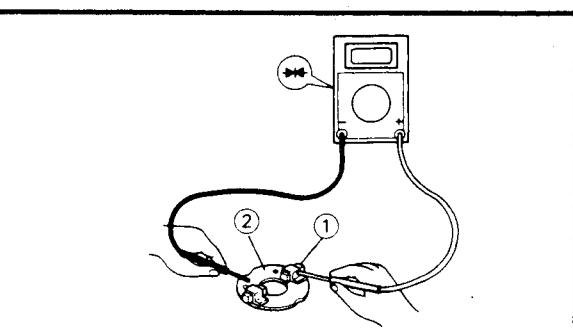
Rotate the pinion clockwise, and check that it freely. Also try to rotate the pinion counterclockwise and confirm that it locks.

**Brush**

1. Measure:

- Brush length ④

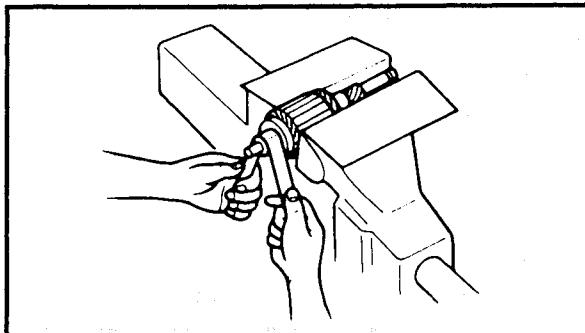
Out of specification → Replace brush holder assembly.


Brush length:
 4.5 ~ 7.5 mm (0.18 ~ 0.30 in)
**Brush holder**

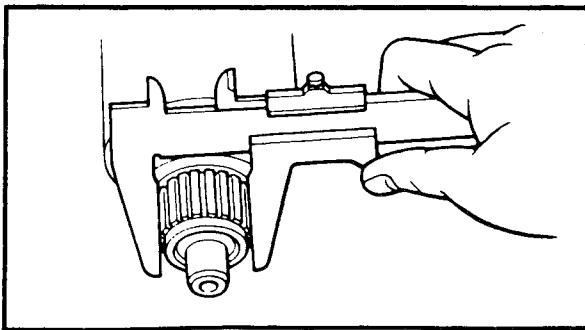
1. Check:

- Brush holder continuity
- Out of specification → Replace.

**Brush holder continuity:**
Positive brush holder ①
- Earth ②
Discontinuity

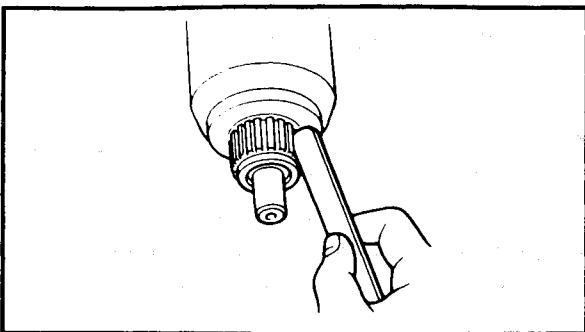
**Armature****1. Inspect:**

- Commutator surface
Dirt/Burnt → Clean with #600 grit wet-or-dry sandpaper.

**2. Measure:**

- Commutator diameter
Out of specification → Replace.

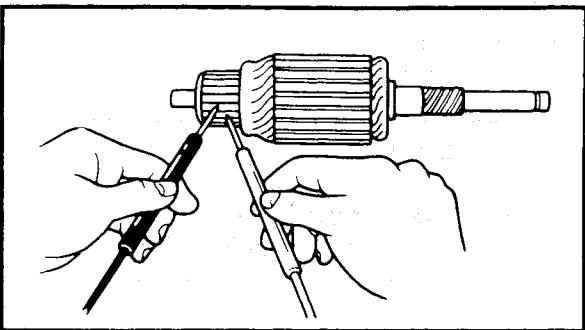
	Commutator diameter: 19.4 ~ 20.0 mm (0.76 ~ 0.79 in)
--	---

**3. Check:**

- Mica undercut
Clog/Dirt → Clean.

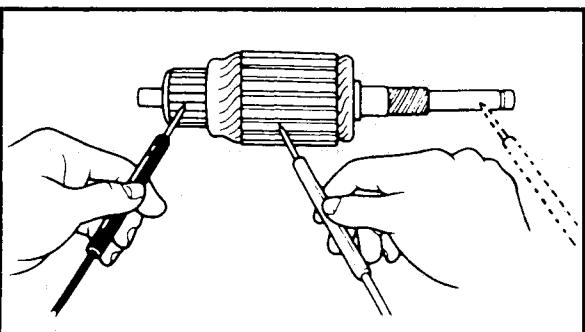
NOTE: _____

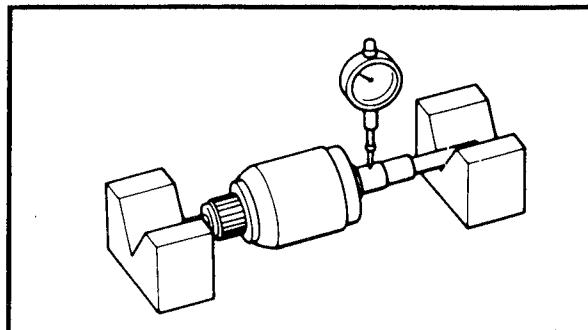
Remove all particles of mica and metal by compressed air.

**4. Check:**

- Armature coil continuity
Out of specification → Replace.

	Armature coil continuity:
Commutator segments	Continuity
Segment - Laminations	Discontinuity
Segment - Shaft	Discontinuity

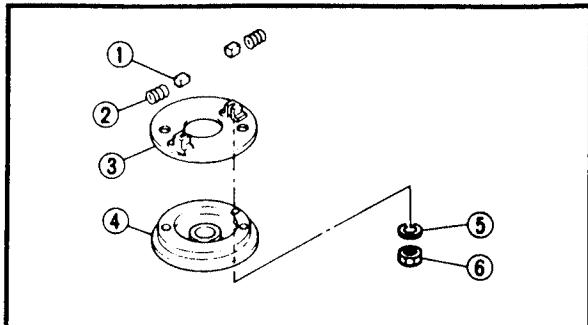


ELEC**STARTER MOTOR****5. Measure:**

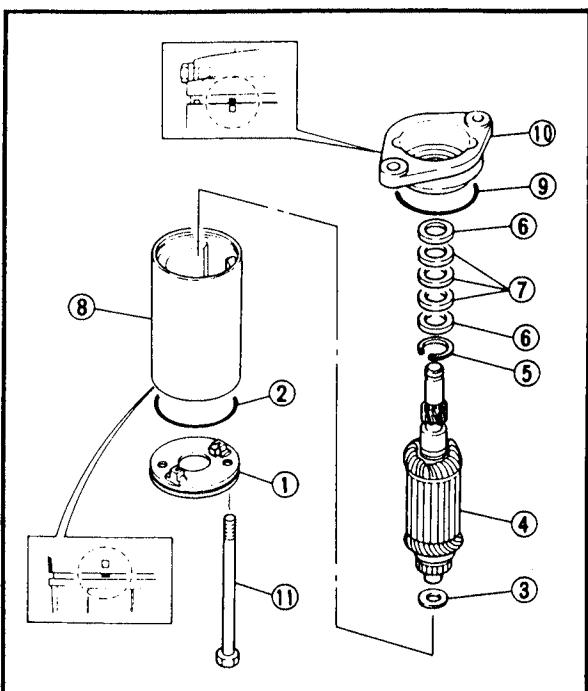
- Commutator deflection
Use a dial-gauge and block.
Out of specification → Replace.



Deflection limit:
0.05 mm (0.002 in)

**ASSEMBLY****1. Install:**

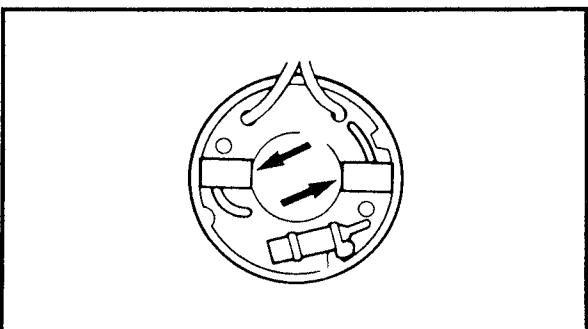
- Brush ①
- Brush spring ②
- Brush holder ③
- Rear cover ④
- Washer ⑤ (spring)
- Nut ⑥

**2. Install:**

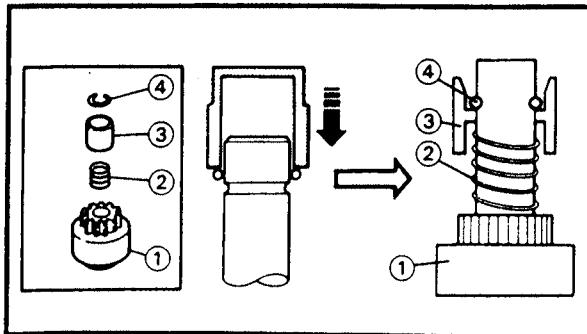
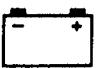
- Rear cover ①
- O-ring ②
- Washer ($t=1.0$ mm) ③
- Armature ④
- Ring ⑤
- Washer ($t=0.5$ mm) ⑥
- Washer ($t=0.25$ mm) ⑦
- Stator ⑧
- O-ring ⑨
- Front cover ⑩
- Through bolt ⑪

NOTE: _____

Align the cut in the cover with the projection on the stator.

**CAUTION:** _____

Do not scratch the brushes when installing the armature on the rear cover.

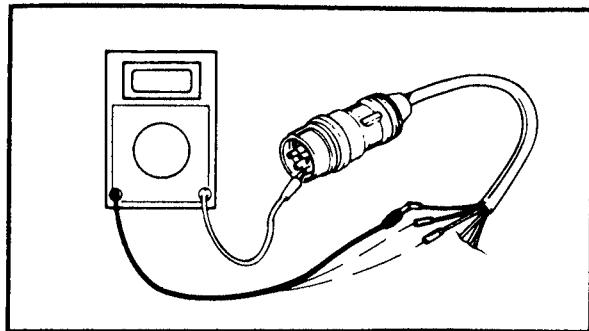


3. Install:

- Pinion ①
- Spring ②
- Pinion stopper ③
- Clip ④

NOTE:

Make sure the clip tightly fits in the pinion stopper.



WIRING INSPECTION

Wiring harness

1. Check:

- Continuity
Out of specification → Replace.

Checking steps:

- Check the continuity between the terminal side and each connector. Cores and pins of identical colors must be connected or a continuity test can not be made.
- If any of the cores are open-circuit, replace the wiring harness.

Wiring connection

1. Check:

- Wiring connection
Poor connection → Correct.

CHAPTER 9

TROUBLESHOOTING

ENGINE AND RELATED PARTS.....	9-1
ENGINE DOES NOT START/ENGINE TURNS OVER BUT STALLS/	
ENGINE RUNS IRREGULARLY, STOPS OR IDLES ROUGHLY.....	9-1
POWER LOSS	9-3
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 GEAR SHIFTING.....	 9-8
GEAR SHIFTING IS IMPOSSIBLE.....	9-8
 ELECTRICAL SYSTEM (ELECTRIC STARTER MODEL)	 9-9
BATTERY IS NOT CHARGED.....	9-9

TRBL
SHTG

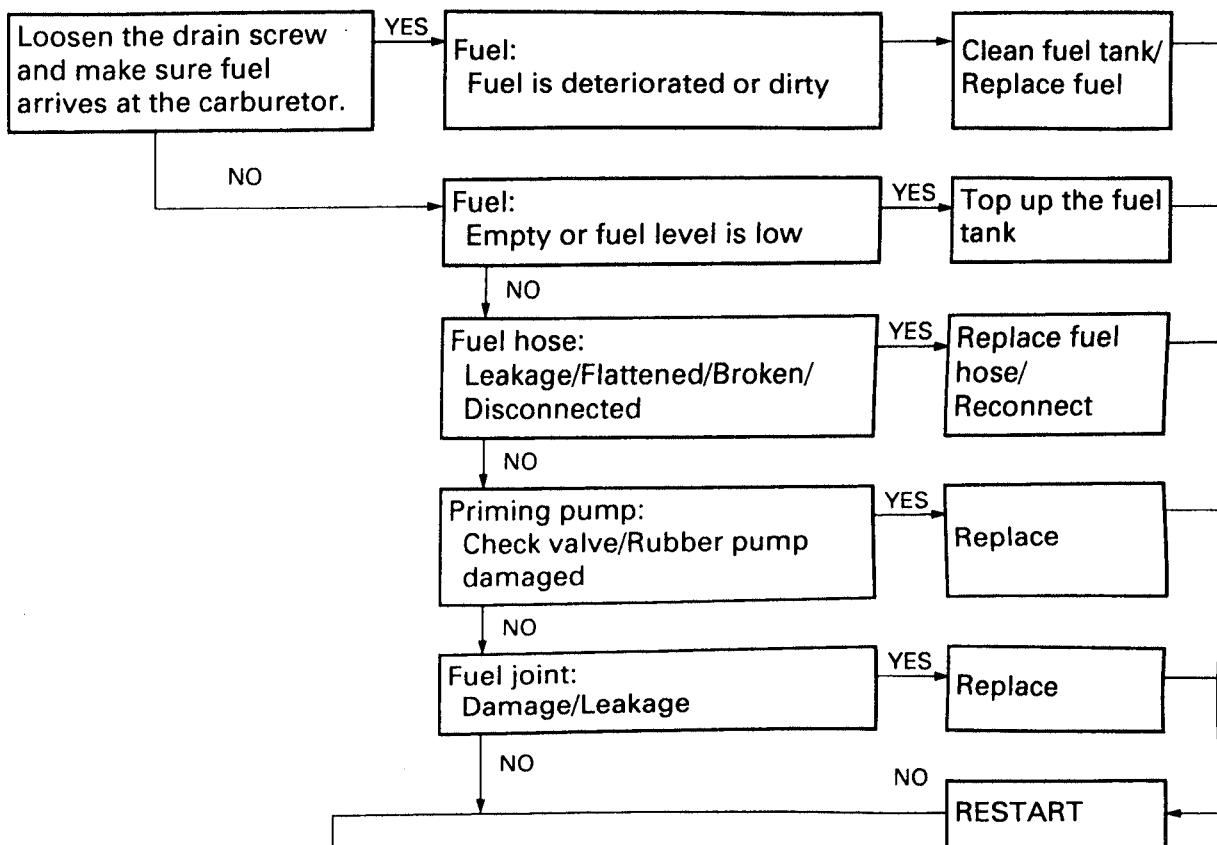


ENGINE AND RELATED PARTS

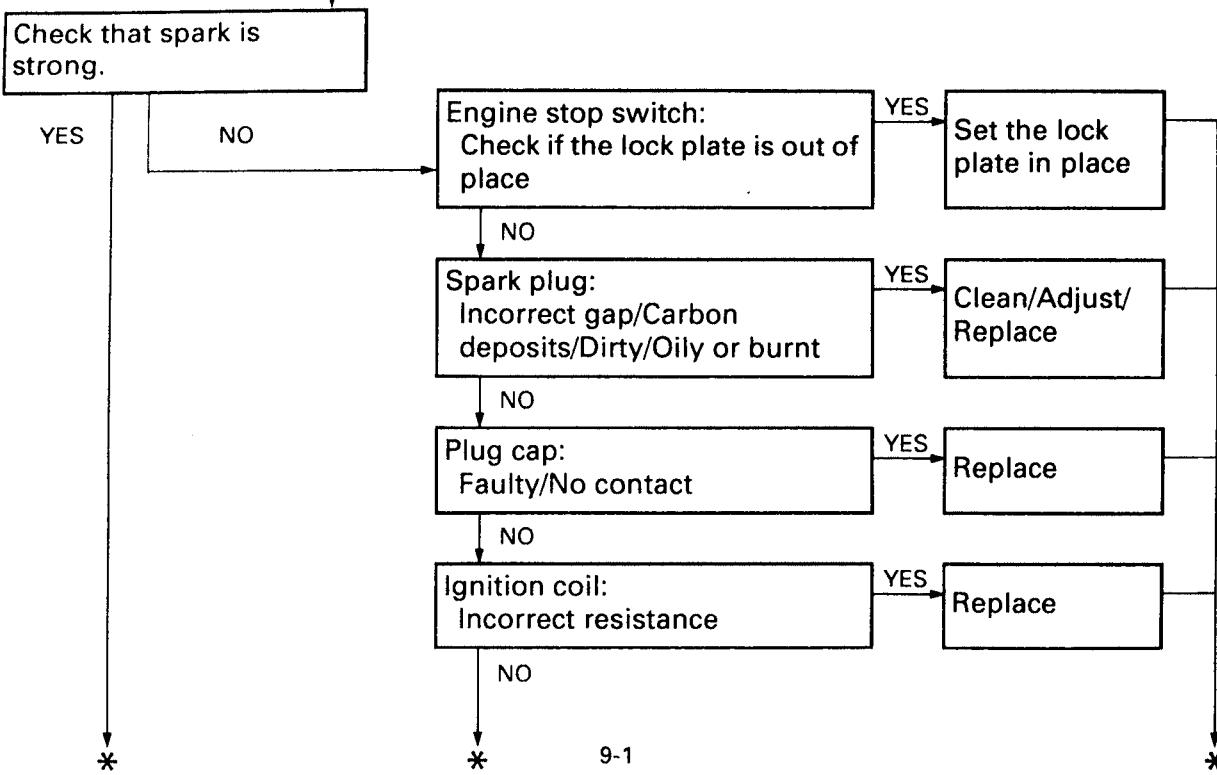
ENGINE AND RELATED PARTS

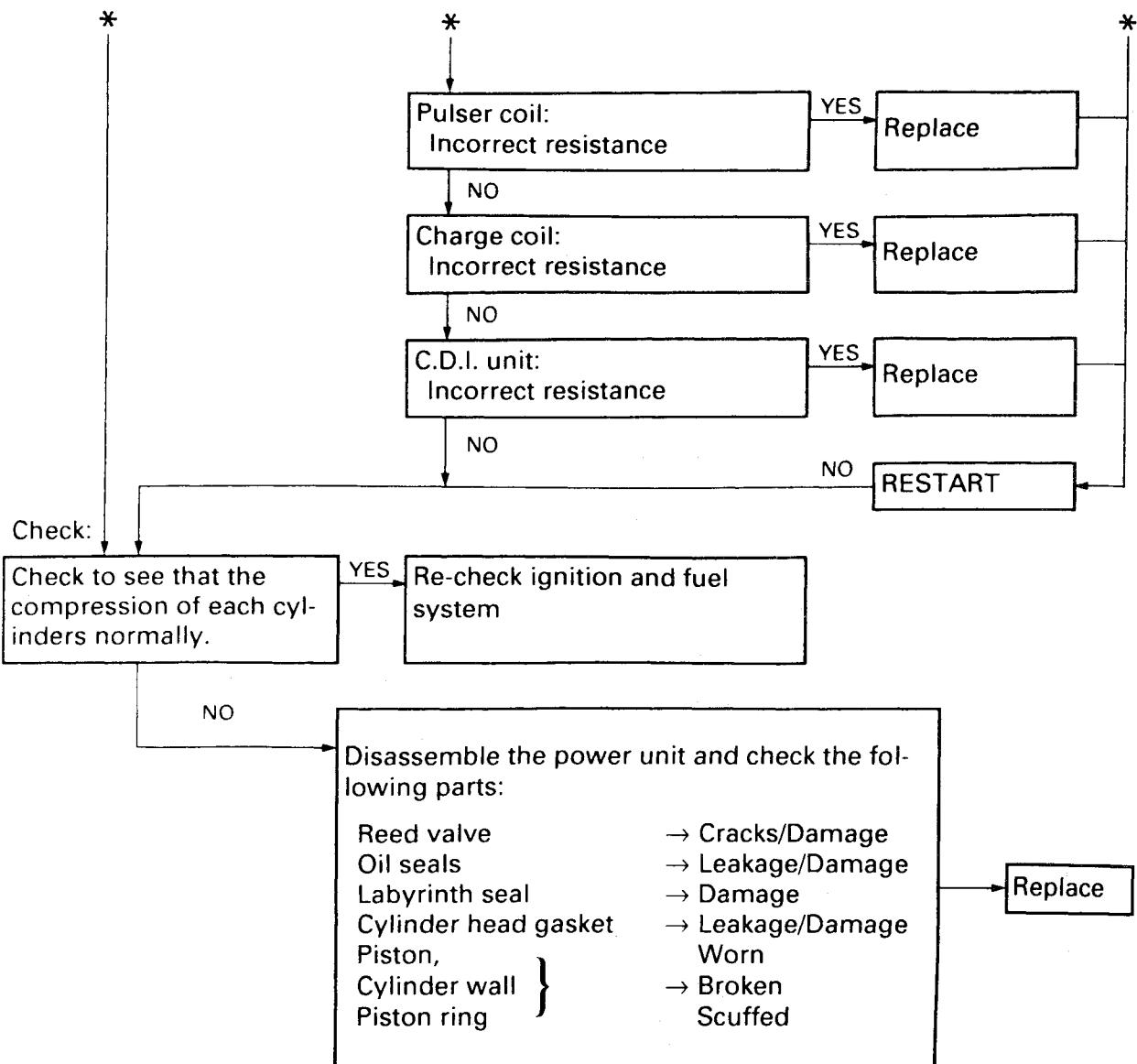
ENGINE DOES NOT START/ENGINE TURNS OVER BUT STALLS/
ENGINE RUNS IRREGULARLY, STOPS OR IDLES ROUGHLY

Check:



Check:

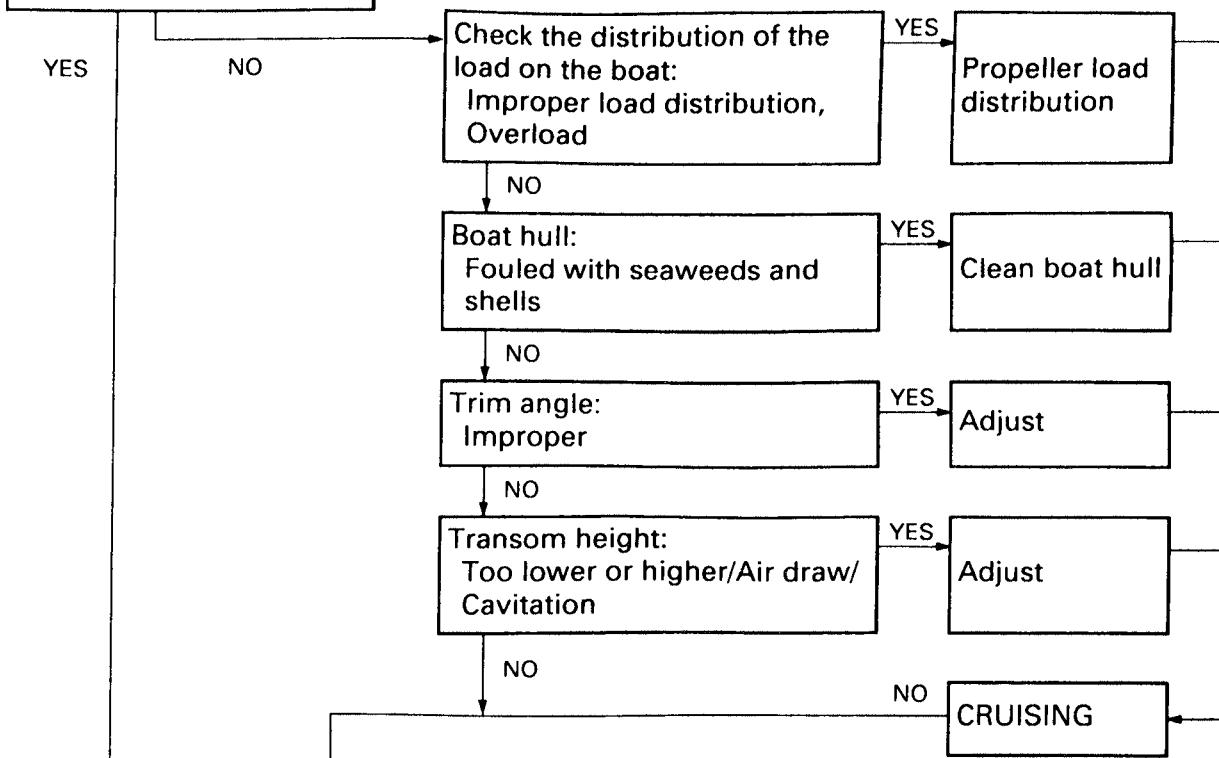




POWER LOSS

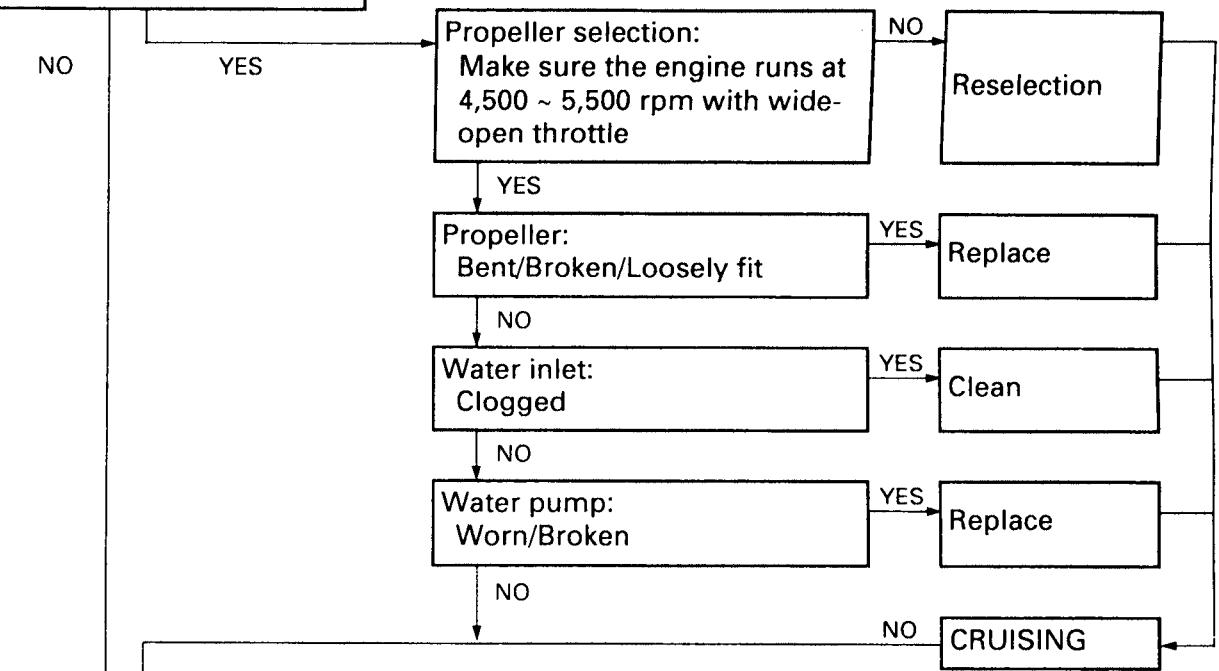
Check:

Boat is loaded properly.

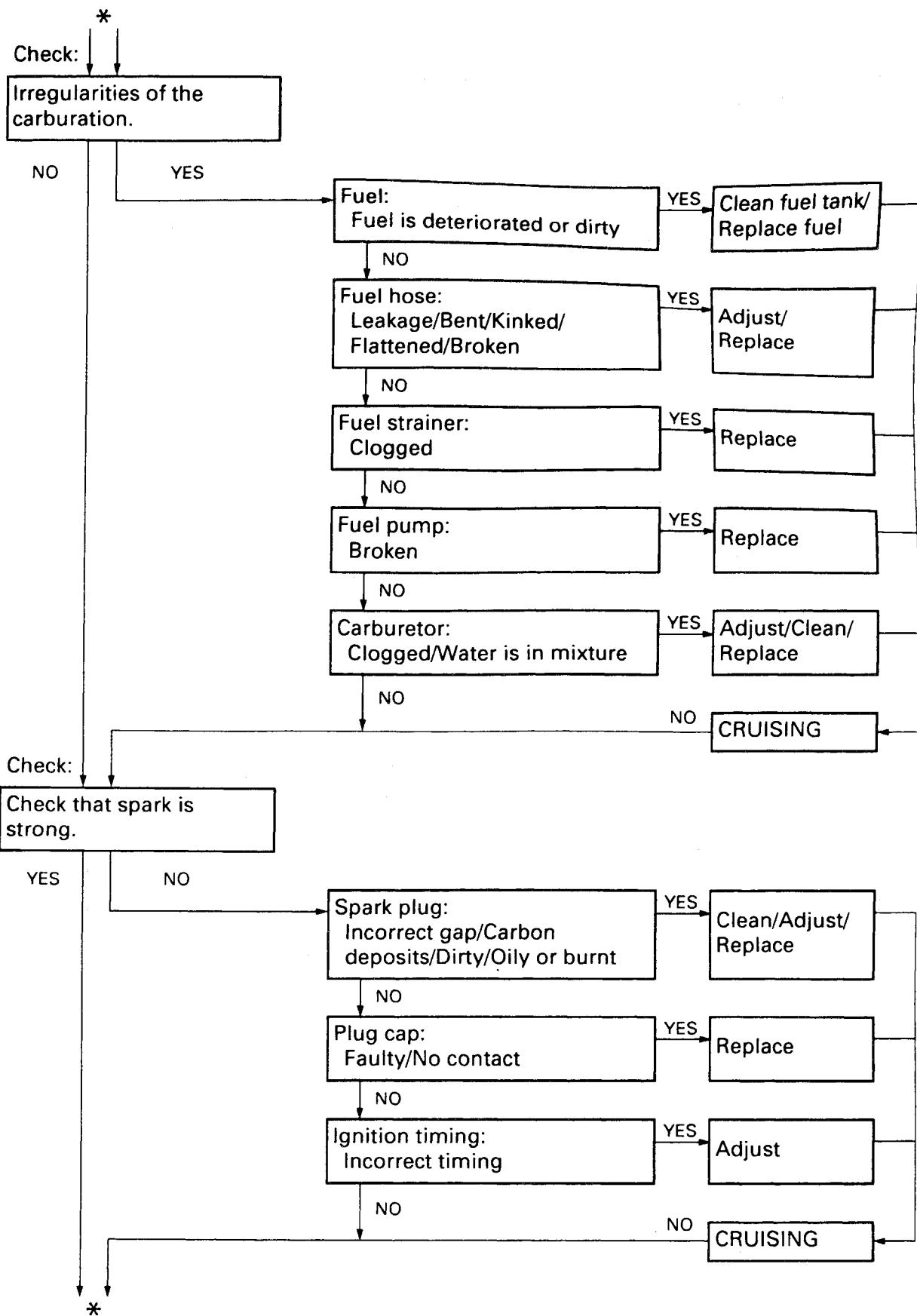


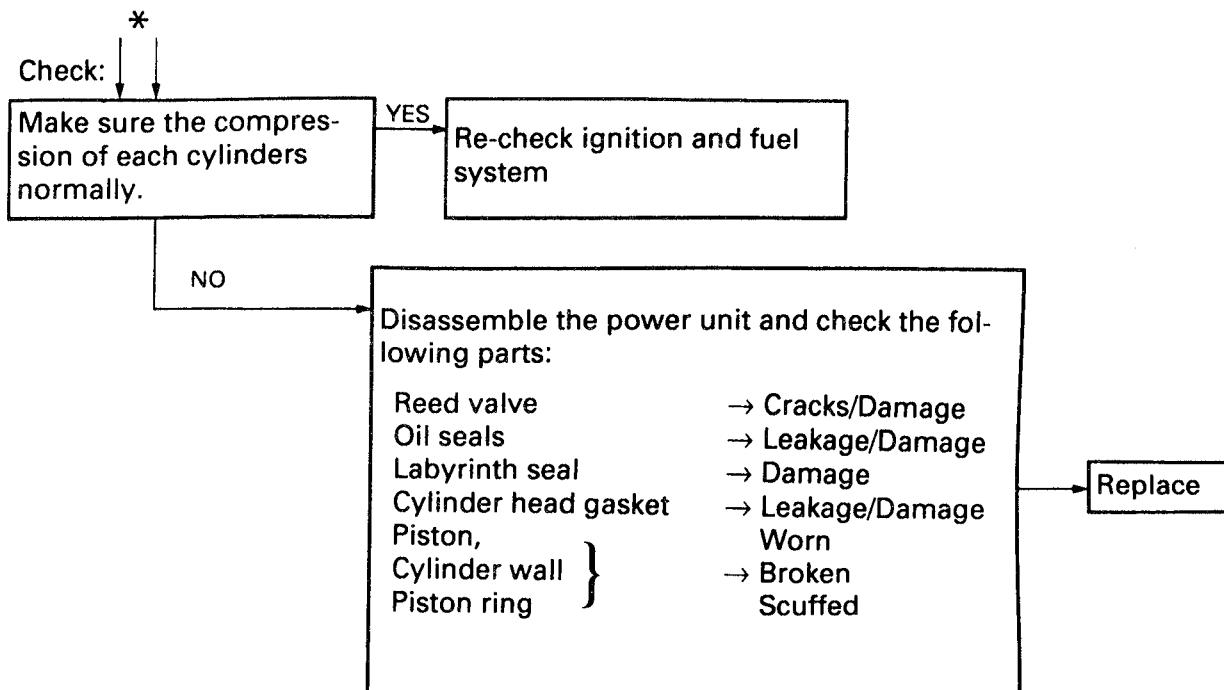
Check:

Irregularities of the lower unit.



*





ENGINE MISFIRES

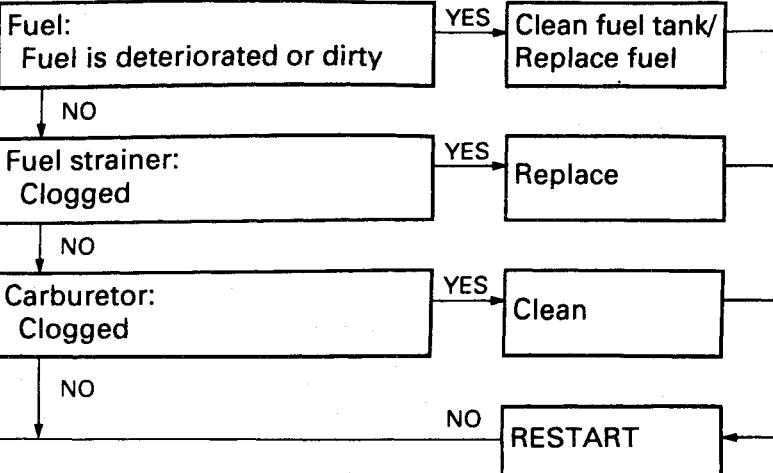
[First check for spark to find cause.]

Check:

Irregularities of the carburation.

NO

YES

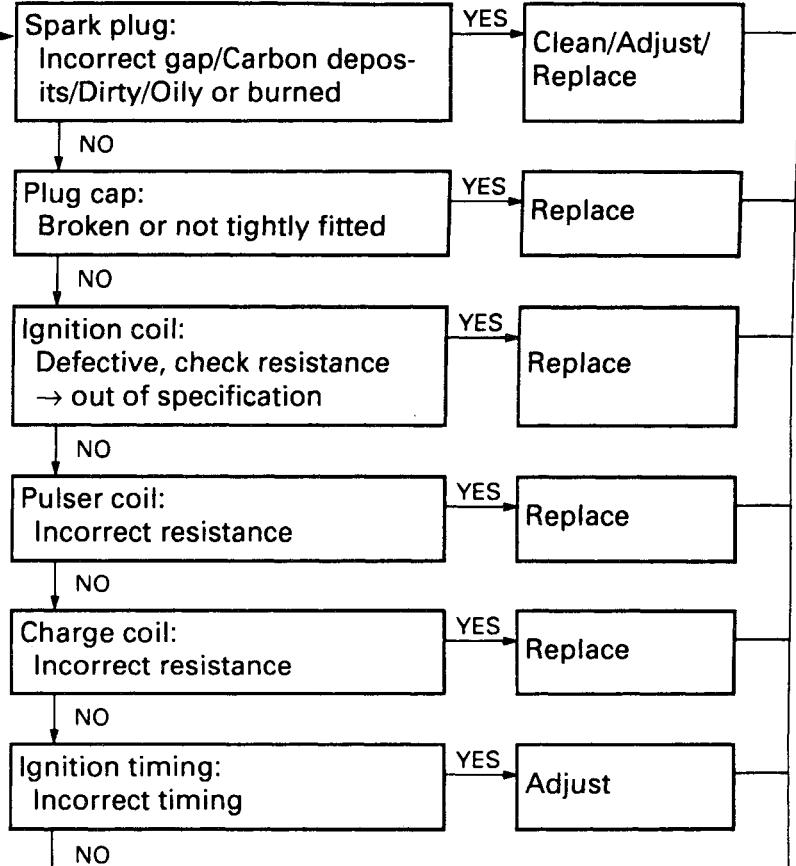


Check:

Check that spark is strong.

YES

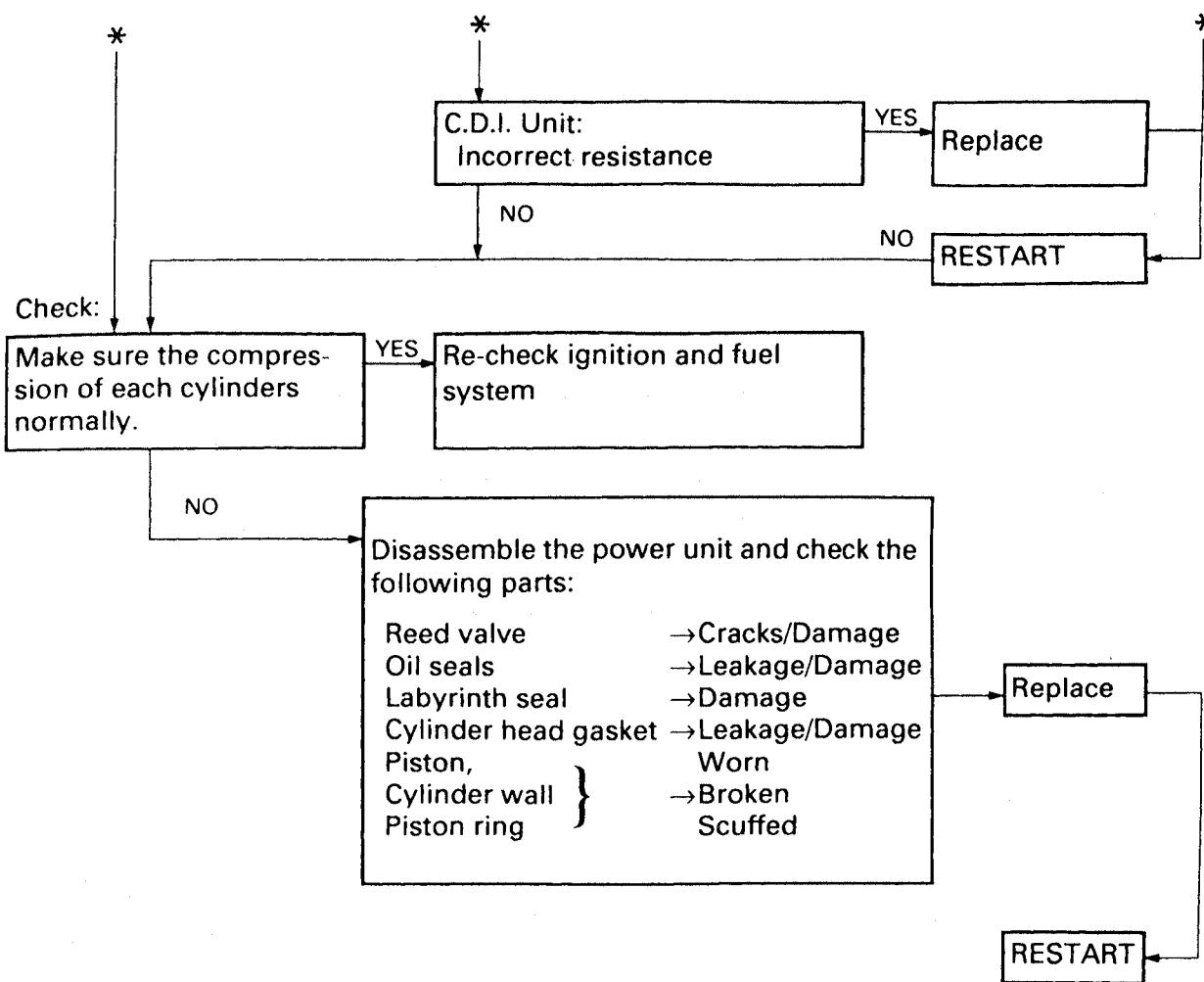
NO



TRBL
SHTG



ENGINE AND RELATED PARTS



TRBL

GEAR SHIFTING

GEAR SHIFTING

GEAR SHIFTING IS IMPOSSIBLE

⚠ WARNING

Do not start engine during this inspection.

Manual handle model

Move shift handle to "Neutral", "Forward" and "Reverse".

Turn propeller and check that gears are in "Neutral", "Forward" and "Reverse".

Check:

Irregularities of the shifting system.

YES

Shift rod connector:
Correctly

NO
Connect
correctly

Shift rod
(power unit side):
Disconnected

YES
Connect
correctly

Shift cam
(lower casing side):
Incorrect move

YES
Replace

Shift plunger/Cross pin/
Dogs (clutch dog):
Wear/Damage

YES
Replace

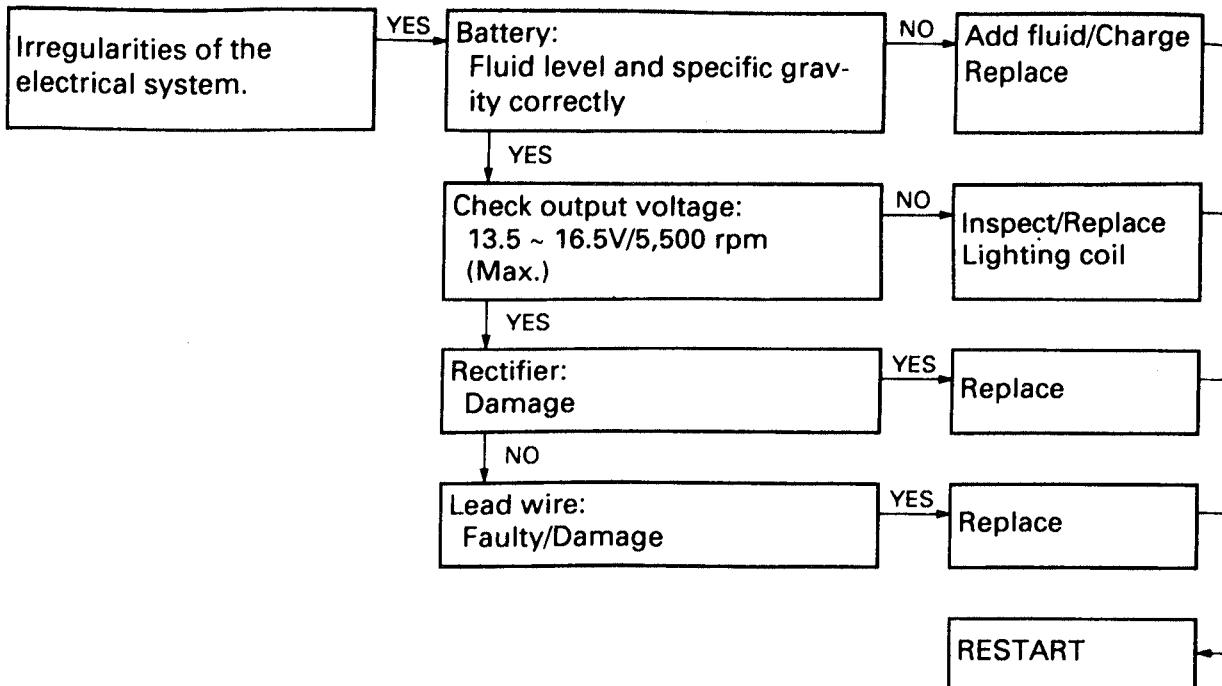
Dogs (gears):
Wear/Damage

YES
Replace

Recheck

TRBL**ELECTRICAL SYSTEM (E MODEL)****ELECTRICAL SYSTEM (ELECTRIC STARTER MODEL)
BATTERY IS NOT CHARGED**

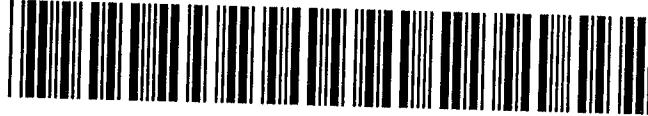
Check:



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LIT-18616-01-64



6V, 8V 1997 Service Manual

1 PC.

LIT186160164

