YAMAHA

Marine

Outboards

WORLD WIDE

25J, 30D

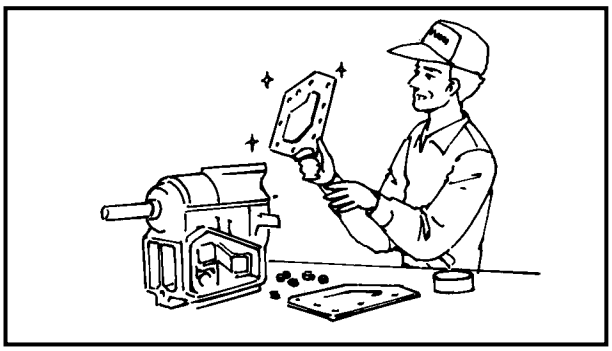
USA, CANADA

25X, 30X

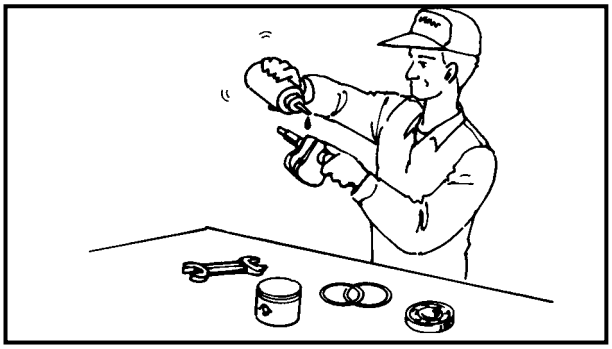
SERVICE MANUAL

LIT-18616-01-94

290342

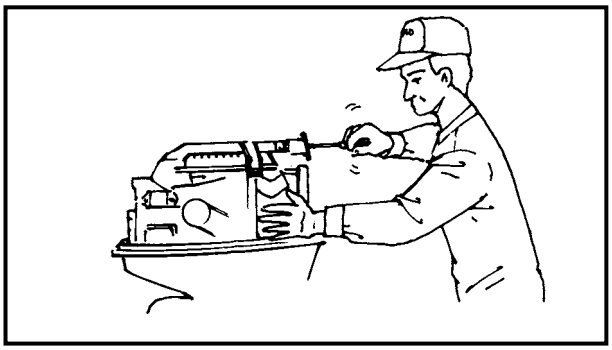


3. **Non-reusable items**
   Always use new gaskets, packings, O-rings, split-pins, circlips, etc., on reassembly.



DISASSEMBLY AND ASSEMBLY

1. Clean parts with compressed air when disassembling.
2. Oil the contact surfaces of moving parts before 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.

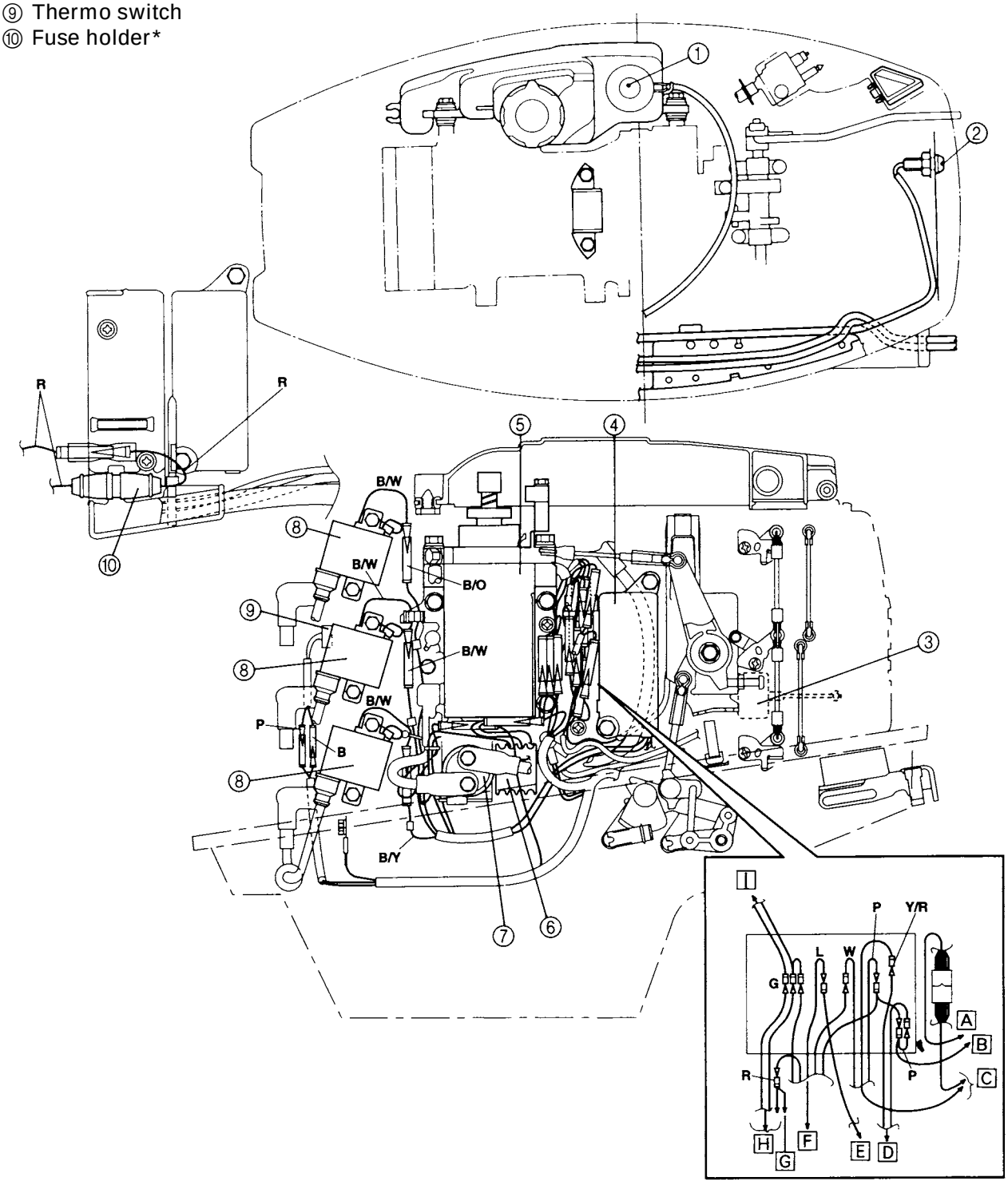
Item	Unit	Model(s)	
		25hp	30hp
REED VALVE			
Stopper plate height	mm (in)	2.65 ± 0.15 (0.10 ± 0.006)	
Warpage limit	mm (in)	0.2 (0.01)	
THERMOSTAT			
Valve opening temperature	˚C (˚F)	48 ~ 52 (118 ~ 126)	
Full-open temperature	˚C (˚F)	60 (140)	
Valve lift	mm (in)	3 (0.12)	
CARBURETOR			
ID mark		6K901/6K911	6J801/6J811
Valve seat size	mm (in)	1.1 (0.04)	1.1 (0.04)
Main jet	#	96	102
Main nozzle	mm (in)	2.3 (0.09)	2.3 (0.09)
Main air jet	#	#1,2: 140 #3: 150	#1,2: 140 #3: 150
Pilot jet	#	54	50
Pilot air jet	#	#1,2: 120 #3: 140	#1,2: 100 #3: 120
Pilot screw	Turns out	3/4 ± 1/4	#1: 3/4 ± 1/4 #2: 1-3/4 ± 1/4 #3: 1 ± 1/4
Float height	mm (in)	16 ± 0.5 (0.63 ± 0.02)	15 ± 0.5 (0.59 ± 0.02)
Idle speed	r/min	750 ± 50 1,050 ± 50 (PTT models)	
Trolling speed	r/min	650 ± 50 800 ± 50 (PTT models)	

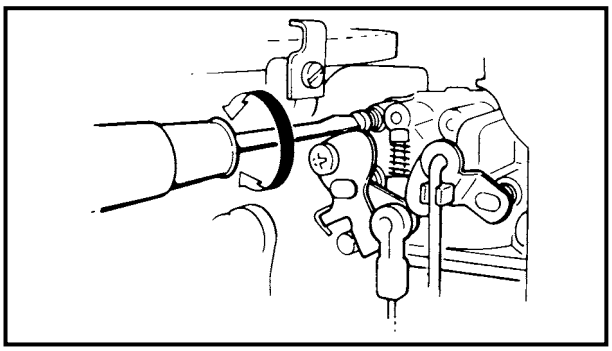
25JEO, 30DMO, 30DE, 30DEO

① Oil level gauge
② Oil level/engine temp. warning lamp
③ Fuel enrichment valve
④ CDI unit
⑤ Starter motor*
⑥ Rectifier*
⑦ Starter relay*
⑧ Ignition coil
⑨ Thermo switch
⑩ Fuse holder*

[A] To stator
[B] To oil level gauge
[C] To CDI unit
[D] To oil level/engine temp. warning lamp
[E] To fuel enrichment valve
[F] To wire harness
[G] To fuse holder
[H] To rectifier
[I] To lighting coil
*: Electric starter model

B : Black
G : Green
L : Blue
O : Orange
P : Pink
R : Red
W : White
Y : Yellow



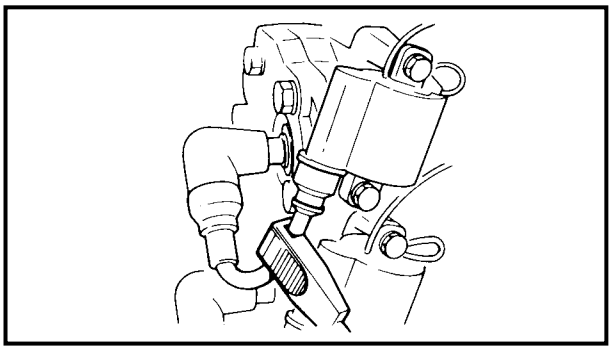


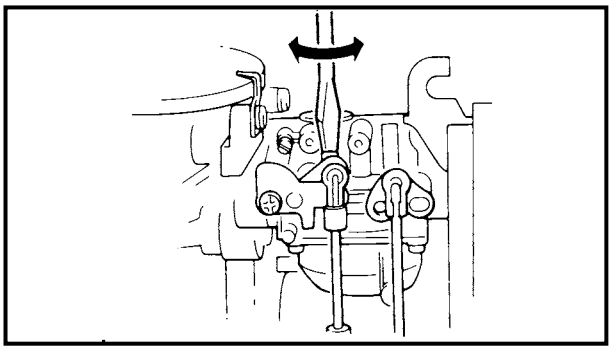
D33000-0

IDLE-SPEED

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

Pilot screw:
25hp:
3/4 ± 1/4
30hp:
No. 1: 3/4 ± 1/4 turns out
No. 2: 1-3/4 ± 1/4 turns out
No. 3: 1 ± 1/4 turns out





3. Start the motor, and allow it to warm up for a few minutes.
4. Set the idle-speed to the specified level by setting the throttle stop-screw. Use a tachometer for checking the speed when adjusting the motor speed.

NOTE:
Turning the throttle stop-screw clockwise increases the motor speed; turning it counterclockwise decreases the motor speed.

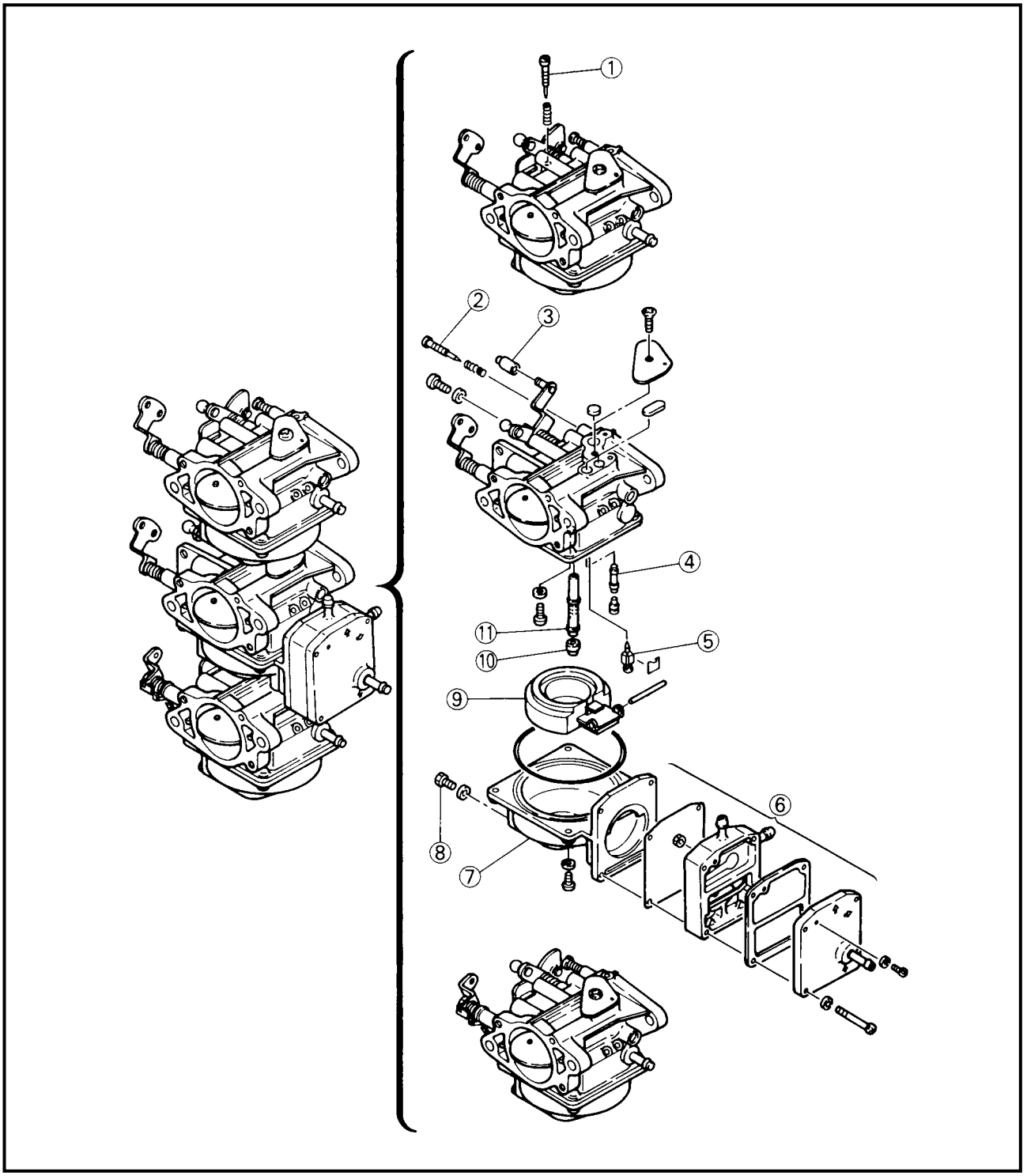
Idle speed:
750 ± 50 rpm
1,050 ± 50 rpm (PTT models)

E31100-0

CARBURETOR

EXPLODED DIAGRAM

① Throttle stop screw
② Pilot screw
③ Collar
④ Pilot jet
⑤ Needle valve
⑥ Fuel pump
⑦ Float chamber
⑧ Drain screw
⑨ Float
⑩ Main jet
⑪ Main nozzle



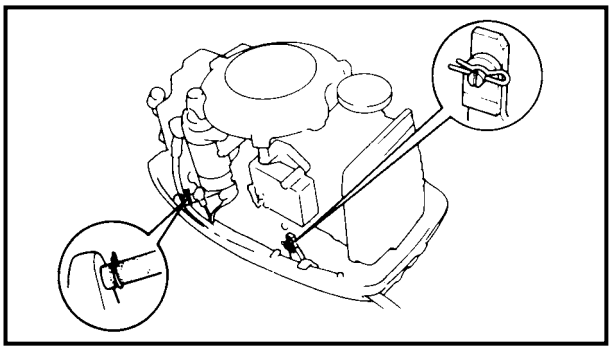
G30000-0

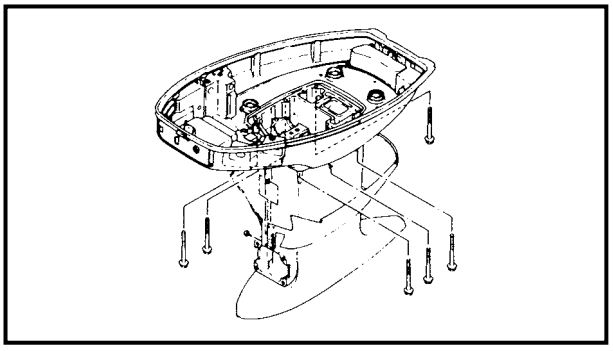
PREPARATION FOR OVERHAUL

1. Clean all dirt, mud, dust and foreign material from the engine before the engine is removed and disassembled.
2. To ensure that you can perform the work cleanly and efficiently, check that you have the proper tools and cleaning equipment before commencing engine removal and disassembly.
3. During engine disassembly, as parts are disassembled, clean them and place them in trays in their order of disassembly. This will speed up assembly and help ensure that all parts are correctly reinstalled.

NOTE:

When disassembling the engine, keep mated parts together, e.g., cylinder and piston and other parts that have been "mated" through normal wear. Mated sets should be re-used on reassembly, or replaced complete.

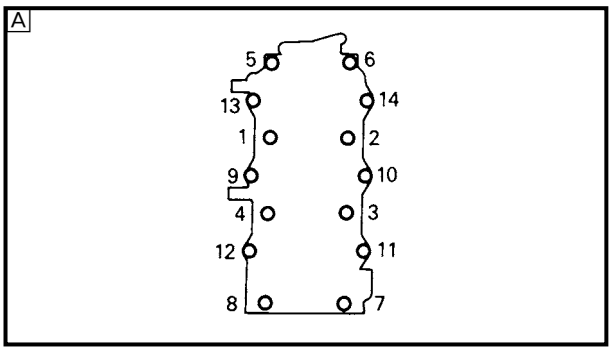




G40000-0

REMOVAL

1. Remove the electrical system parts referring to page 8-1.
2. Remove the fuel system parts referring to page 4-1.
3. Disconnect the hoses and control cables referring to the illustrations.
4. Remove the apron and power head installation bolts, and then remove the power head from the upper casing.

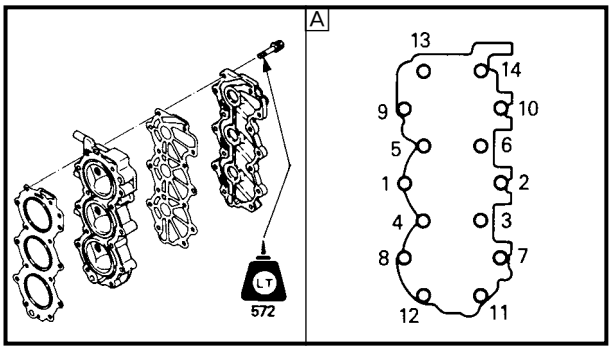


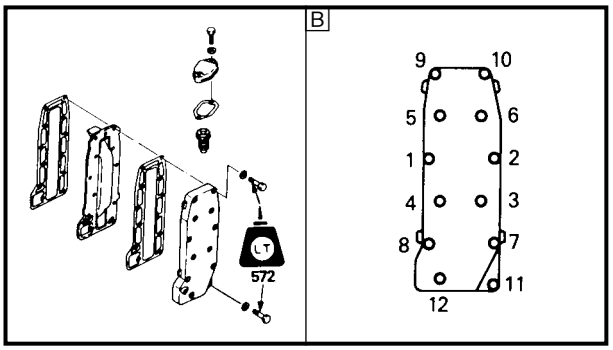
5. Match the crank case and tighten the bolts in sequence and in two steps of torque.

A Tightening sequence

1st step:
M8: 15 Nm (1.5 m • kgf, 11 ft • lb)
M6: 5 Nm (0.5 m • kgf, 3.6 ft • lb)
2nd step:
M8: 28 Nm (2.8 m • kgf, 20 ft • lb)
M6: 11 Nm (1.1 m • kgf, 8.0 ft • lb)

6. Check that the crankshaft turns smoothly.





G75004-0

CYLINDER HEAD AND EXHAUST COVER

1. Install the new gaskets, cylinder-head cover and exhaust cover.

CAUTION:

Do not apply any sealing compound to gasket.

2. Tighten the bolts in two sequence and in two steps of torque.

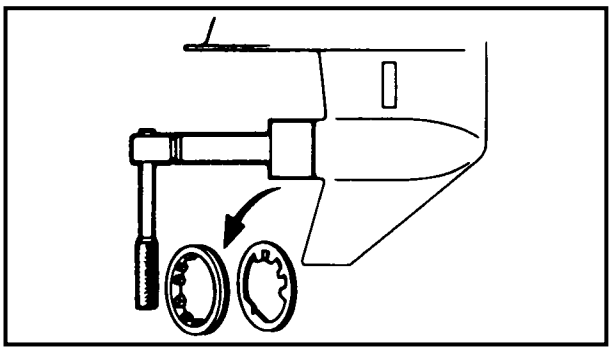
A Tightening sequence

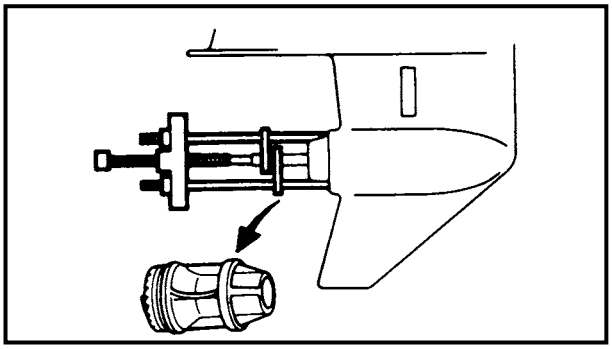
Cylinder head:
1st step:
15 Nm (1.5 m • kgf, 11 ft • lb)
2nd step:
28 Nm (2.8 m • kgf, 20 ft • lb)

B Tightening sequence

Exhaust cover:
1st step:
3 Nm (0.3 m • kgf, 2.2 ft • lb)
2nd step:
8 Nm (0.8 m • kgf, 5.8 ft • lb)

3. Install the thermostat, gasket and cover.





- Ring-nut and claw-washer
  Using special service tool.

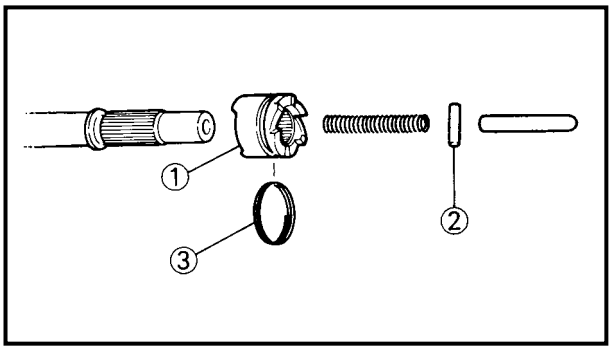
Ring nut wrench:
YB-6075/90890-06509
Extension ring nut wrench:
90890-06513

NOTE:

To remove a ring-nut: straighten the lobe of the claw-washer by use of a screwdriver, then attach and turn the special service tool.

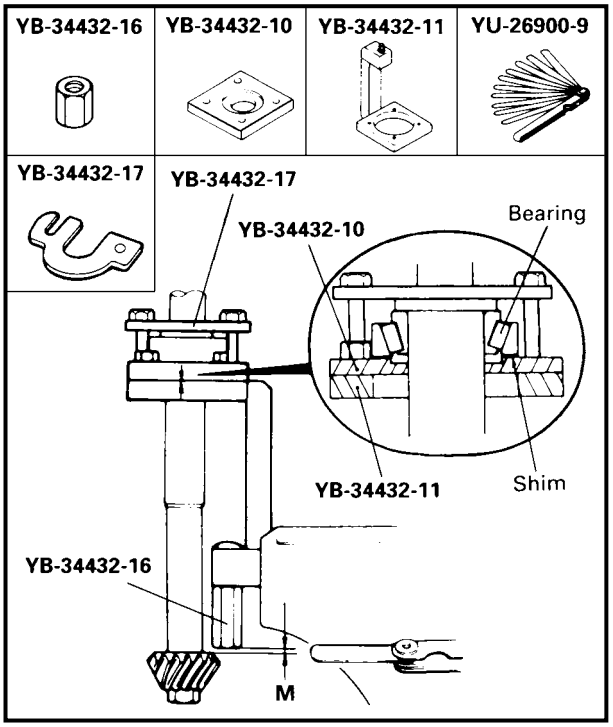
- Bearing-housing
  Using special service tool.

Bearing housing puller:
YB-6234/90890-06503
Universal puller:
YB-6117
Stopper guide plate:
90890-06501
Center bolt:
90890-06504



- Propeller shaft assembly
- Cross-pin ring, cross-pin and clutch-dog

① Clutch dog
② Cross pin
③ Cross pin ring



Pinion gear shim

1. Assembly the shimming gauge with the drive shaft and bearing as shown in the illustration.

Gauge block:
YB-34432-16
Gauge base:
YB-34432-11
Adapter plate:
YB-34432-10
Clamp:
YB-34432-17
Thickness gauge:
YU-26900-9

NOTE:

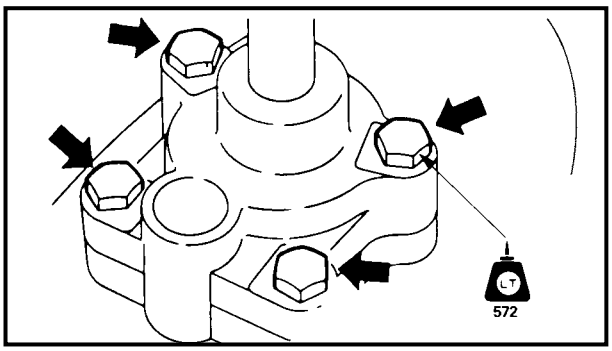
Using four bolts of the following dimensions, install the adapter plate (YB-34432-10) on the gauge base (YB-34432-11).

2. Install the pinion on the drive shaft, and tighten the nut to the specified torque.

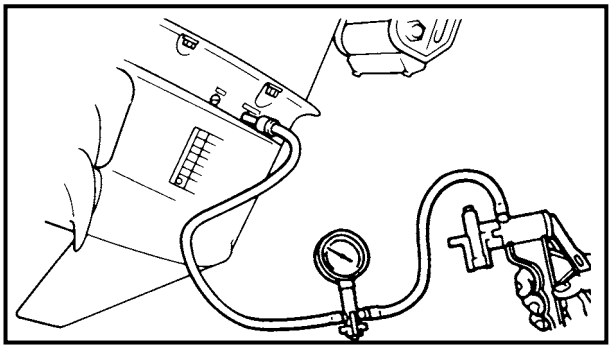
Pinion nut:
50 Nm (5.0 m • kgf, 36 ft • lb)

3. Measure the measured value (M) between the pinion as shown.

Available shim thicknesses:
0.05, 0.08, 0.12, 0.30, and 0.50 mm



5. Grease the impeller, and install the water-pump housing, turning the drive shaft clockwise, then tighten the bolts.



165000-0

LOWER UNIT LEAKAGE CHECK

1. Tighten the gear oil-drain screw, and connect a mity vac to the oil-level hole.

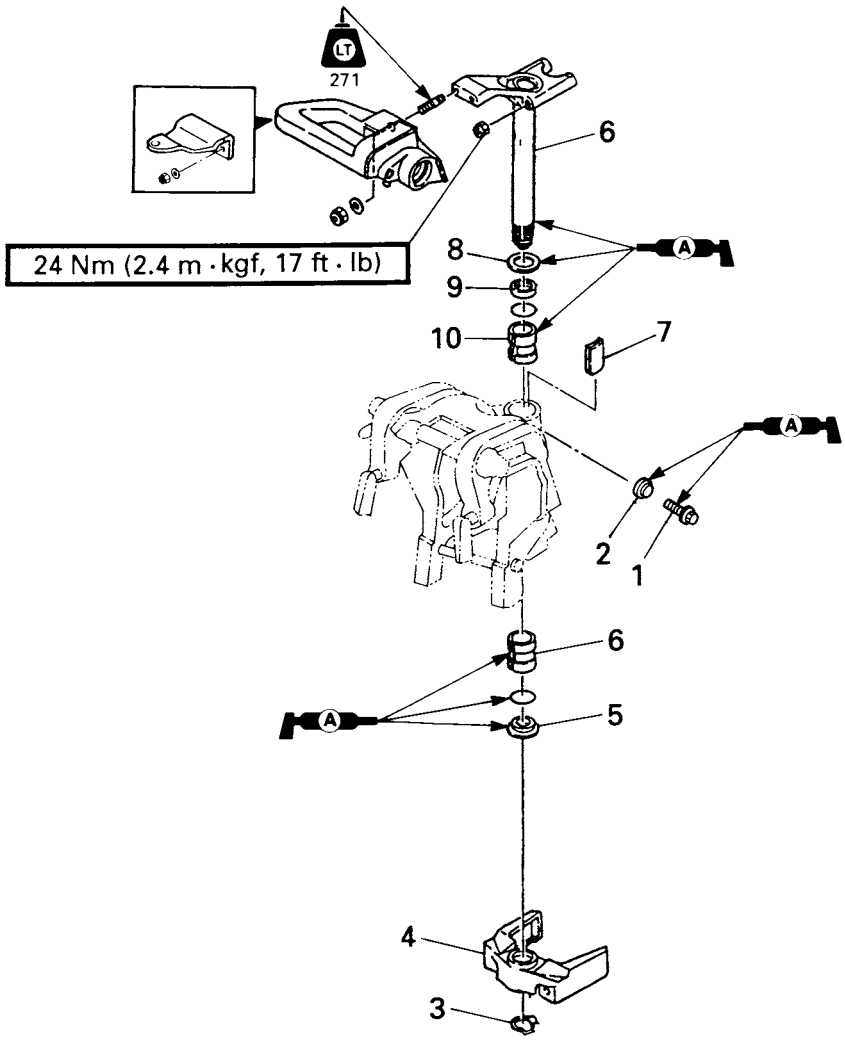
	Mity vac: YB-35956/90890-06756

2. Pump the tester, and apply a pressure of 100 kPa (1.0 kg/cm^2, 14.2 psi).
   Then place the gear case in the water tank.
3. Check that the pressure is held at 100 kPa (1.0 kg/cm^2, 14.2 psi) for 10 seconds.

NOTE:

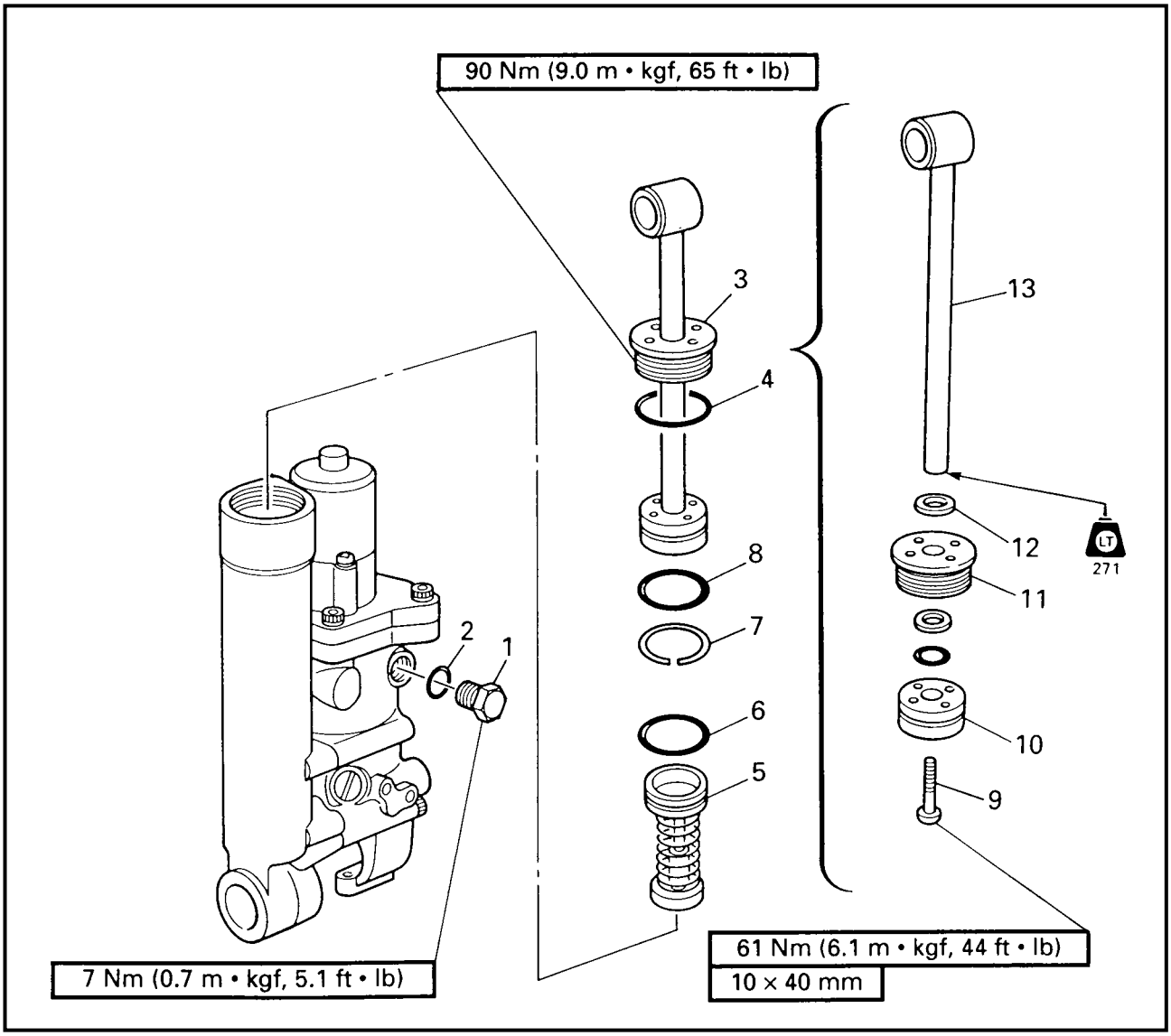
- If the pressure falls, the leakage from lower unit is unacceptable, requiring re-inspection of its component parts.
- Do not over-pressurize. Excess pressure may cause the air to leak out.

EXPLODED DIAGRAM



Step	Procedure/Part name	Q'ty	Service points
6	Steering bracket	1	
7	Friction plate	1	
8	Plate washer	1	
9	Bushing	1	
10	Bushing	2	
			Reverse the removal steps for installation.

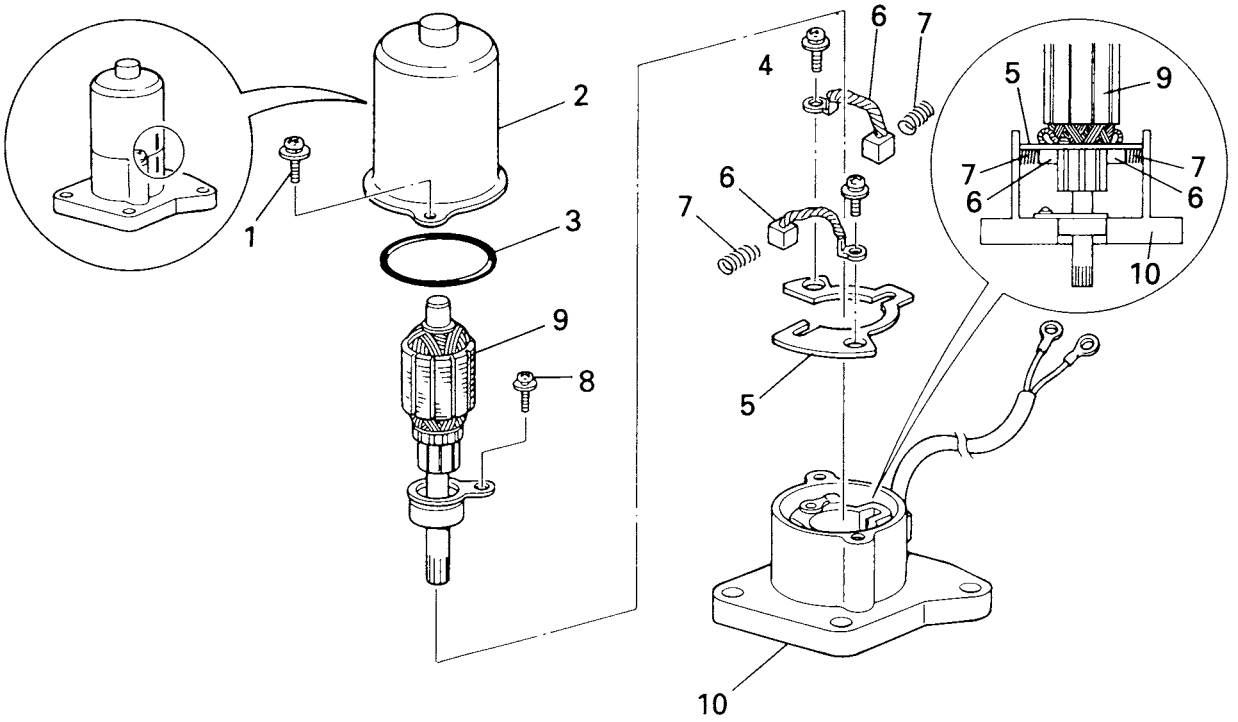
EXPLODED DIAGRAM



Step	Procedure/Part name	Q'ty	Service points
9	Bolt	1	
10	Tilt piston assy.	1	
11	Tilt cylinder end screw	1	
12	Oil seal	1	
13	Tilt rod	1	
			Reverse the disassembly steps for installation.

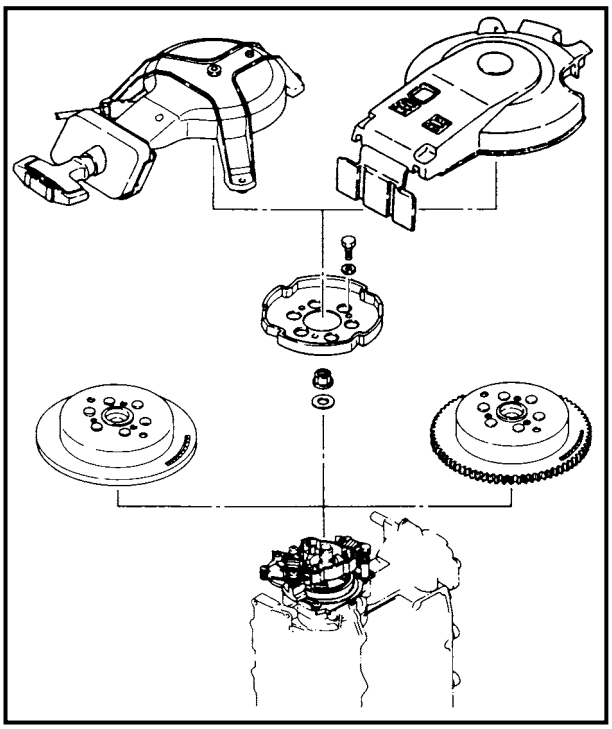
PTT MOTOR

EXPLODED DIAGRAM



REMOVAL AND INSTALLATION CHART

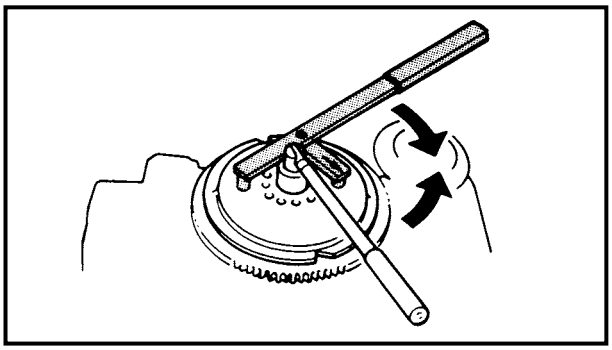
Step	Procedure/Part name	Q'ty	Service points
	PTT MOTOR DISASSEMBLY		Follow the left "Step" for removal.
	PTT motor		
1	Screw	2	
2	Stator	1	
3	O-ring	1	49.5 × 2.0 mm
4	Screw	2	
5	Brush holder	1	
6	Brush	2	
7	Brush spring	2	
8	Screw	1	
9	Armature	1	
10	PTT motor base	1	
			Reverse the disassembly steps for installation.



FLYWHEEL MAGNETO

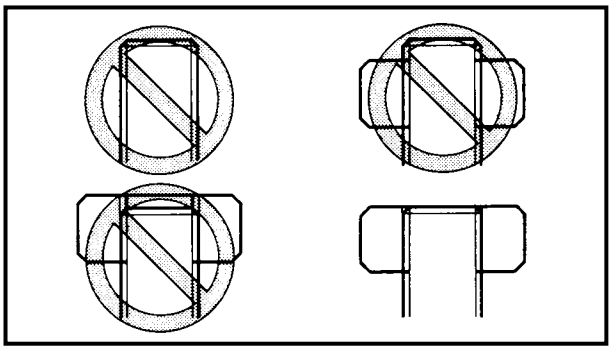
REMOVAL

1. Remove the recoil starter or flywheel cover.
2. Remove the starter-pulley.



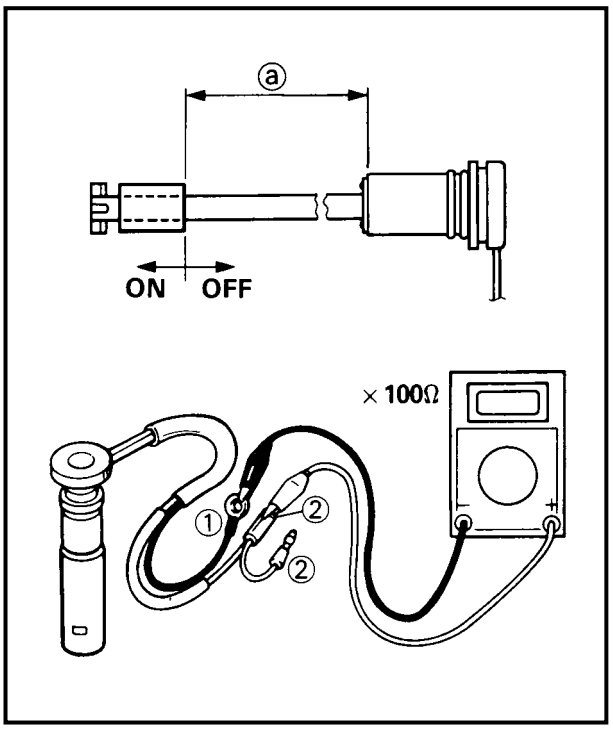
3. Using the special service tool, loosen the flywheel nut until it is flush with the crankshaft.

Flywheel holder:
YB-6139/90890-06522



CAUTION:

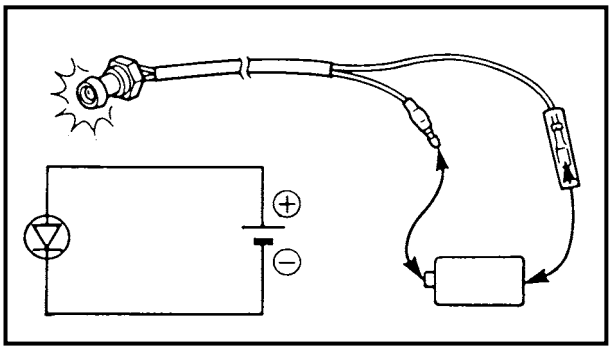
The major load must be carried in the direction of the arrows, for it not the holder may easily slip off.



Oil level gauge check:

Float SW. OFF			Float SW. ON ⓐ 56.3 ~ 59.3 mm (2.22 ~ 2.33 in)		
Tester ⊖ / Tester ⊕	① Black	② Pink	Tester ⊖ / Tester ⊕	① Black	② Pink
① Black		*∞	① Black		*∞
② Pink	*∞		② Pink	Continuity	

*: "∞" indicates that the pointer deflects once and returns to "∞".



OIL LEVEL/ENGINE TEMP. WARNING LAMP

1. Check:
   - LED (Light emitting diode) lighting
     No lighting → Replace.

Battery voltage:
1.5 V

Yellow/Red lead → Positive terminal.
Pink lead → Negative terminal.

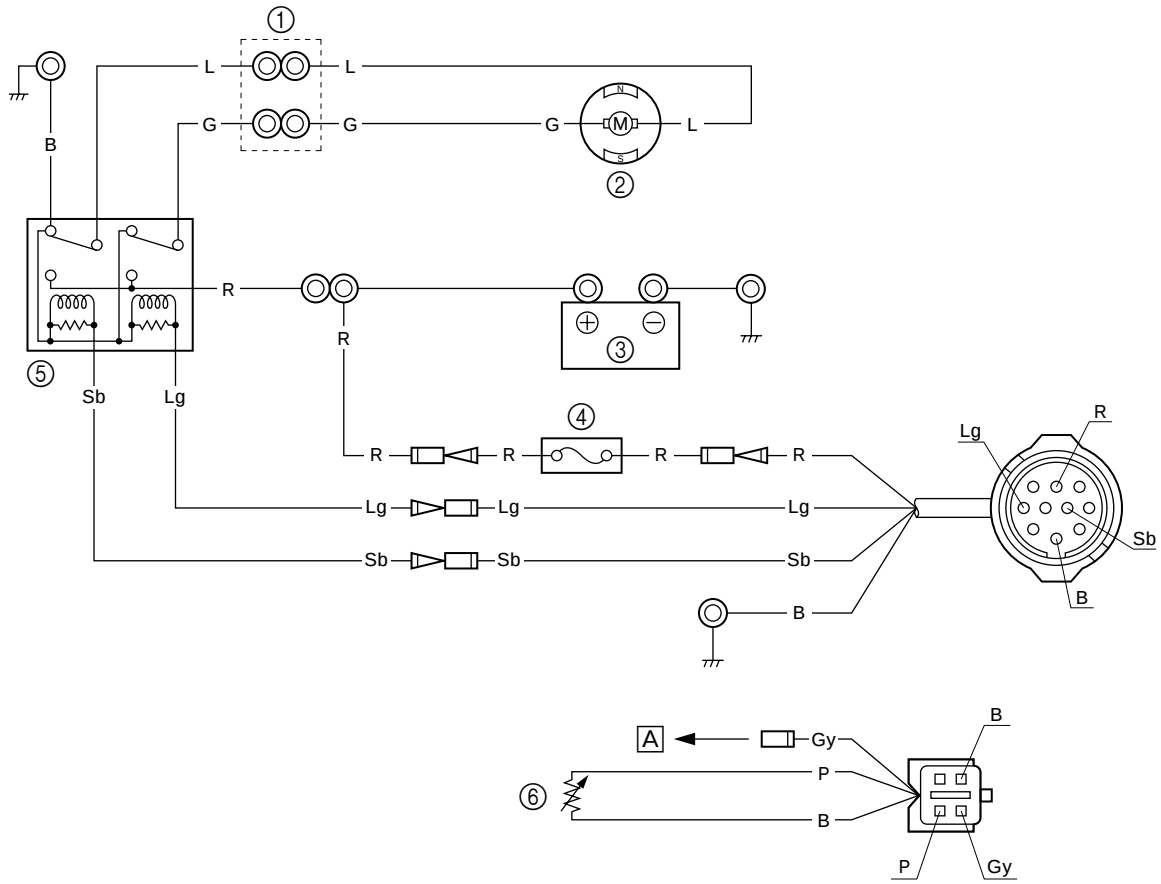
CAUTION:

Use only originally pen light battery (1.5 V) other than batteries such as alkaline battery/higher voltage one will be burnt the diode.

NOTE:

LED has an direction for electrical current. Therefore try reverse connection of there is no lighting.

POWER TRIM AND TILT (PTT) CONTROL SYSTEM
(25JETO, 30DET, 30DETO)



① Terminal
② PTT motor
③ Battery
④ Fuse
⑤ PTT relays
⑥ Trim sensor

A Power supply lead

B : Black
G : Green
Gy : Gray
L : Blue
Lg : Light green
P : Pink
R : Red
Sb : Sky blue

YAMAHA

Marine

Outboards

30U

SERVICE MANUAL

LIT-18616-01-37

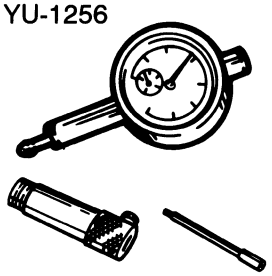
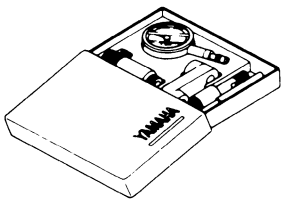
A80701-0*

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.

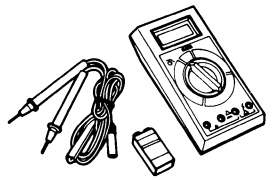
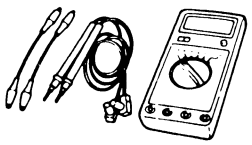
NOTE:

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

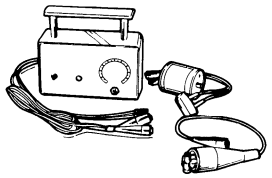
YU-3097 YU-1256	90890-01252
	

FOR TUNE-UP

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

YU-34899-A	90890-06752
	

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

YU-91022-B


3. CDI tester
   P/N. YU-91022-B

C20000-0

GENERAL SPECIFICATIONS

Item	Unit	Model			
		30MH, 30DMO	30EH, 30DEMO	30ER, 30DEO	30DRO
Overall length	mm (in)	993 (39.1)		662 (26.1)	
Overall width	mm (in)	360 (14.2)		307 (12.1)	
Overall height (S)	mm (in)	1,158 (45.6)	—	1,140 (44.9)	1,158 (45.6)
Overall height (L)	mm (in)	1,279 (50.4)		1,261 (49.6)	1,279 (50.4)
Boat transom height (S)	mm (in)	381 (15.0)	—	381 (15.0)	
Boat transom height (L)	mm (in)	508 (20.0)			
Weight (S)	kg (lb)	60.0 (132.2)	—	60.0 (132.2)	59.0 (130.1)
Weight (L)	kg (lb)	62.0 (136.7)	64.5 (142.2)	62.0 (136.7)	61.0 (134.5)
Maximum out put	kW (PS)/rpm	22.1 (30.0)/5,000			
Speed range at full-throttle	rpm	4,500~5,500			
Maximum fuel consumption	ℓ (US gal)/h at rpm	13 (3.4)/5,500			
Engine type	stroke	2			
Number of cylinders		3			
Total displacement	cm^3 (cu.in)	496 (30.3)			
Bore and stroke	mm × mm (in × in)	59.5 × 59.5 (2.3 × 2.3)			
Compression ratio		6.8			
Standard spark plug [NGK]		B7HS-10			
(Noise suppressor) [NGK]		BR7HS-10			
Carburetor		3			
Carburetor starting system		Choke			
Intake system		Reed valve			
Scavenging system		Loop charged			
Exhaust system		Propeller boss			
Lubrication system		Oil injection system			
Cooling system		Water			
Ignition system		C.D.I.			
Starting system		Electric			
Fuel		Regular gasoline			
Fuel rating	P.O.N.*1	Min. 86			
Engine oil type		Two-cycle outboard motor oil*2			
Engine oil grade		TC-W3			
Engine oil tank capacity	ℓ (US gal)	0.8 (0.9)			

*1 Pump Octane number; (Research octane + Motor octane) 1/2
*2 YAMALUBE two-cycle outboard motor oil is recomended in U.S.A.
YAMALUBE 1 is recomended in CANADA.

D20000-0

PREDELIVERY SERVICE

CONTENTS

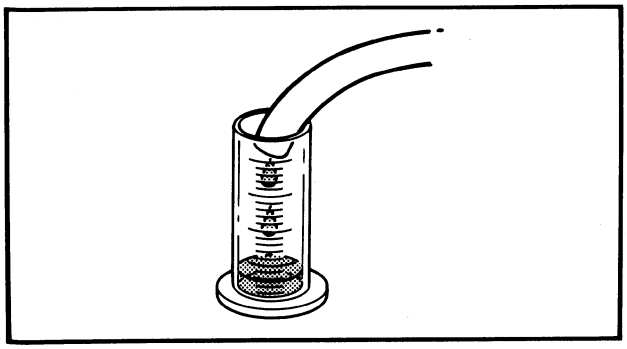
D21000-0

PACKING LIST

On unpacking check that all accessories to the model are included.

	30MH, 30DMO	30EH, 30DEMO	30ER, 30DEO	30DRO
Outboard motor	○	○	○	○
Fuel tank	○	○	○	○
Remote control box	—	—	○	—
Service tools	○*	○*	○*	○*
Emergency starter rope	○	○	○	○
Motor mounting parts	—	○	○	○
Spare spark plug	○*	○*	○*	○*
Owner's manual	○	○	○	○

*: Except for U.S.A.

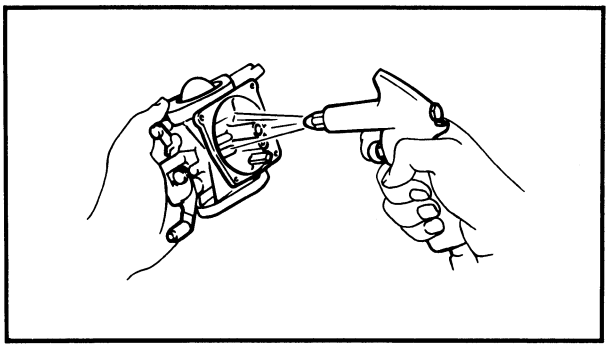


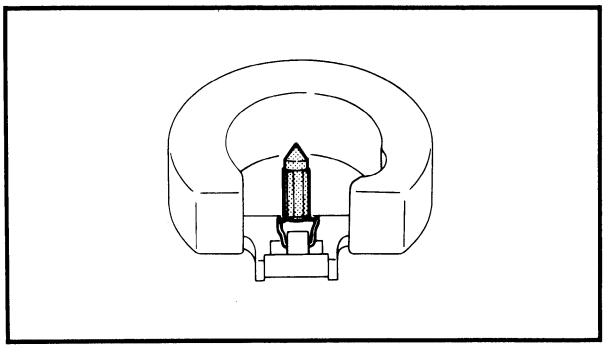
2) Remove the oil-pump link-rod, and fix the oil-pump lever in the full-throttle position.
3) Measure the oil discharge from each port for three minutes, using a measuring cylinder graduated in steps at least of 0.1 cc to confirm that the specified amount is discharge.

Specified discharge:
(each port)
0.7±0.1 cm³
(0.025±0.004 Imp oz,
0.024±0.003 US oz)

NOTE:

1. When measuring with the measuring cylinder, ensure that no oil clings to the cylinder wall, for otherwise the measurement will be inaccurate.
2. Use only genuine Yamaha oil, for if the viscosity is too high or too low, the measurement of the discharge will be inaccurate.
3. The longer the time over which measurement is made, the more accurate will be the measurement. Calculate the rate of discharge per minute.





D31600-1

CARBURETOR

1) Check the fuel passages and air passages for fouling or clogging. Clean fouled parts with suitable cleaning solvent and blow out clogged passages with compressed air.

⚠ WARNING

Protect your eyes with suitable safety spectacles or safety goggles when using compressed air.

2) Check the needle-valve for wear, and replace it if worn.

E21510-0

REMOVAL

⚠ WARNING

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

2. 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.

3. Spillage
Remember that fuel remains in the fuel hose between the fuel joint and the fuel filter. Drain all remaining fuel out into a container, or soak it up with a cloth so that the fuel does not spill on to the bottom cowling.

4. Leaks
Failure to check for and correct fuel leaks may result in fire or explosion.

1) Referring to the exploded diagram, remove the fuel line.

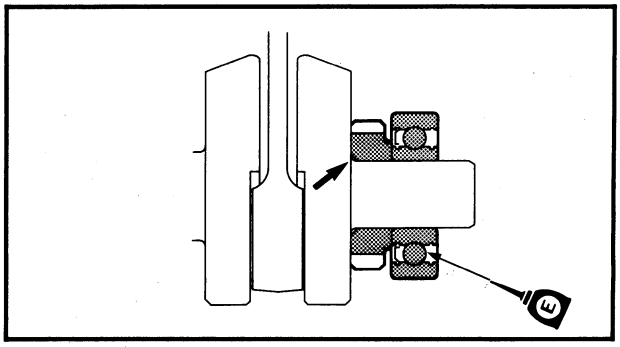
E21010-0

CLEANING AND INSPECTION

Fuel tank

1) Add a small quantity of a suitable cleaning solvent to the fuel tank and thoroughly clean the tank interior by shaking the tank.
2) Drain off the cleaning solvent completely.

CHAPTER 5.
POWER UNIT



G71002-0

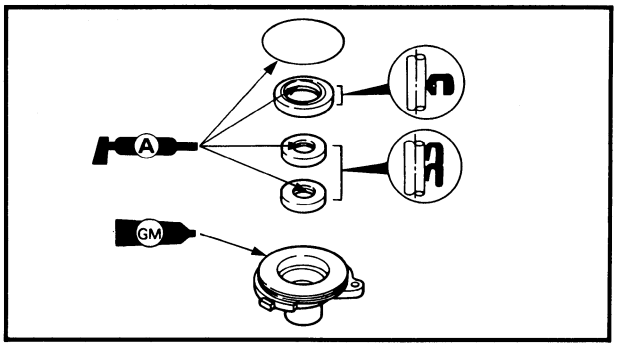
ASSEMBLY AND ADJUSTMENT

BEARING, OIL SEAL, O-RING AND OIL PUMP DRIVE GEAR

1) Using press, install the oil pump drive gear and the new bearing.

CAUTION:

When reassembling the lower crank bearing and/or the oil-pump drive gear, the chamfered bore edge side of the drive gear and the seal-cap side of the bearing should be installed towards the crank side, as shown in the illustration.

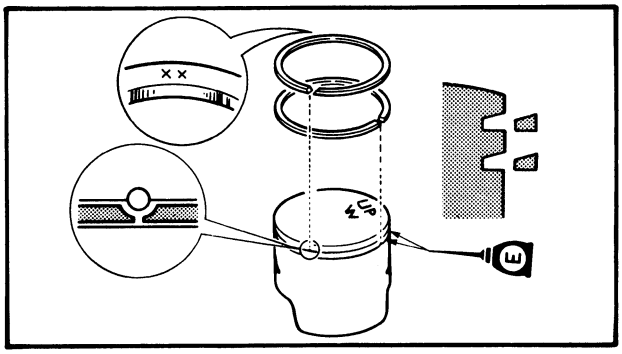


2) Install the new oil seal in the oil seal housing.

CAUTION:

The direction of the oil seal must be as shown in the illustration, otherwise damage will be caused.

3) Install the new O-ring.
4) Lubricate the bearing with two-cycle outboard motor oil. Apply water resistant grease or equivalent to the inside lip of the oil seal and to the O-ring.



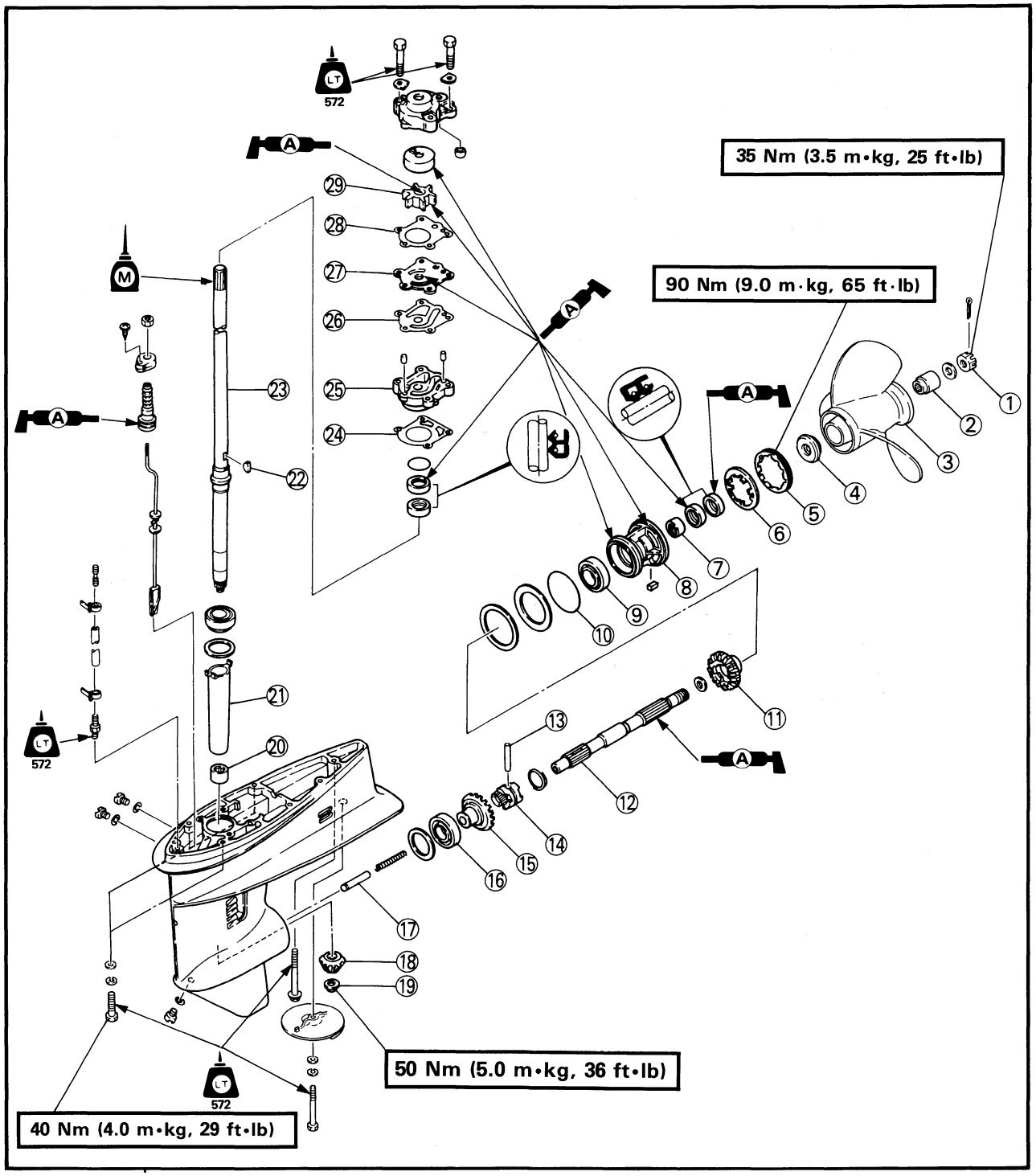
G72002-0

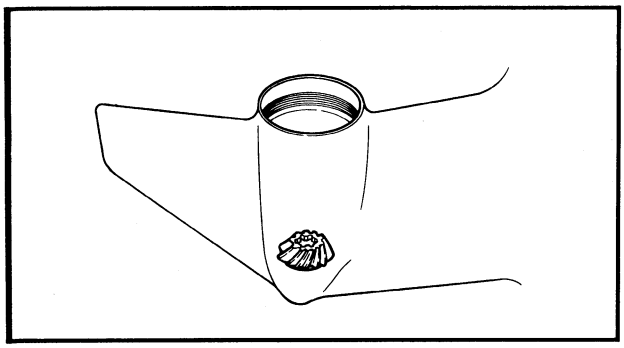
PISTON

1) Install the 2nd and top ring.
2) Align each ring end-gap with their locating pins.

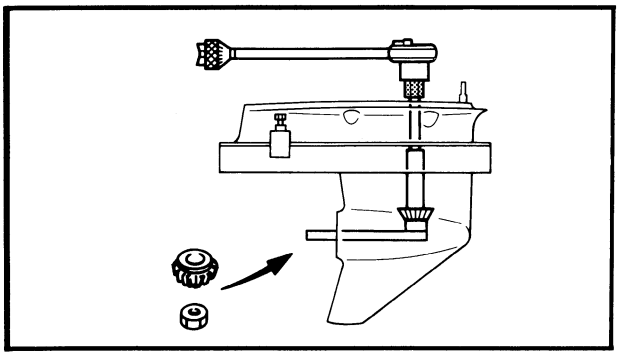
EXPLODED DIAGRAM

① Nut
② Spacer
③ Propeller
④ Spacer
⑤ Ring nut
⑥ Claw washer
⑦ Needle bearing
⑧ Bearing housing
⑨ Bearing
⑩ O-ring
⑪ Reverse gear
⑫ Propeller shaft
⑬ Cross pin
⑭ Clutch dog
⑮ Forward gear
⑯ Bearing
⑰ Shift plunger
⑱ Pinion
⑲ Pinion nut
⑳ Needle bearing
㉑ Drive shaft sleeve
㉒ Woodruff key
㉓ Drive shaft
㉔ Water pump gasket
㉕ Water pump housing
㉖ Cartridge outer plate gasket
㉗ Cartridge outer plate
㉘ Water pump gasket
㉙ Impeller





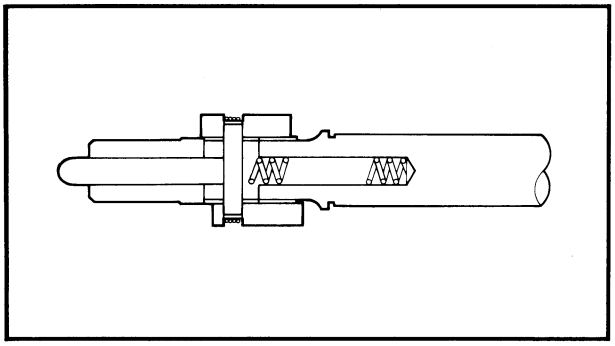
6) Place the forward-gear complete on to the outer race.



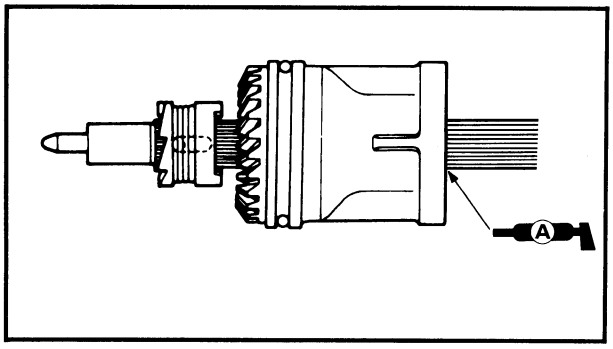
7) Place the drive-shaft in the gear case, and insert it into the pinion.
Tighten the pinion nut to the specified torque.

Drive shaft holder:
YB-6079-A/90890-06517
Pinion nut holder:
YB-6078/90890-06505

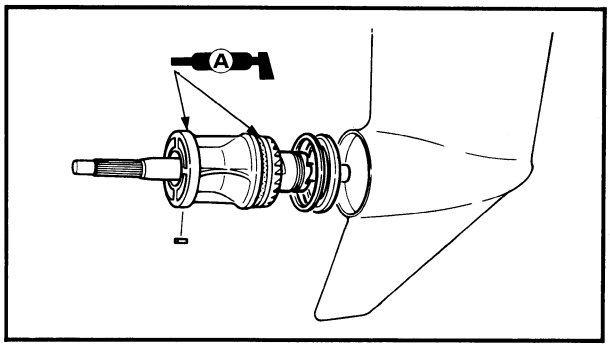
Pinion nut:
50 Nm (5.0 m·kg, 36 ft·lb)



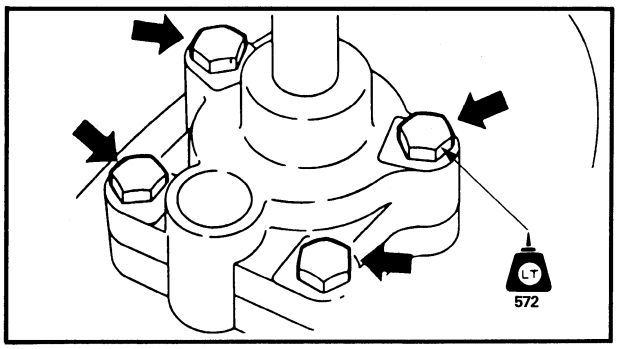
8) Referring to the illustration, assemble the propeller shaft.
Insert the shift spring and shift plunger into the open end of the propeller shaft.
By pushing the shift plunger, bring the cross pin hole in the clutch dog and insert the cross pin into the hole, then install the cross pin ring.



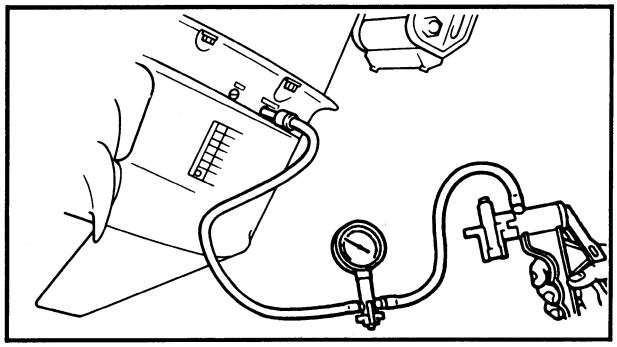
9) Grease the lips of the oil-seals, and insert the propeller shaft complete into the bearing housing.



10) Place the reverse-gear shim in place, then install the bearing housing, aligning the keyway in the gear-case with that in the bearing-housing, and insert the key.



5) Grease the impeller, and install the water-pump housing, turning the drive shaft clockwise, then tighten the bolts.



I65000-0

LOWER UNIT LEAKAGE CHECK

1) Tighten the gear oil-drain screw, and connect a mity vac to the oil-level hole.

	Mity vac: **YB-35956/90890-06756**

2) Pump the tester, and apply a pressure of 100 kPa (1.0 kg/cm^2, 14.2 psi).
   Then place the gear case in the water tank.
3) Check that the pressure is held at 100 kPa (1.0 kg/cm^2, 14.2 psi) for 10 seconds.

NOTE:

- If the pressure falls, the leakage from lower unit is unacceptable, requiring re-inspection of its component parts.
- Do not over-pressurize. Excess pressure may cause the air to leak out.

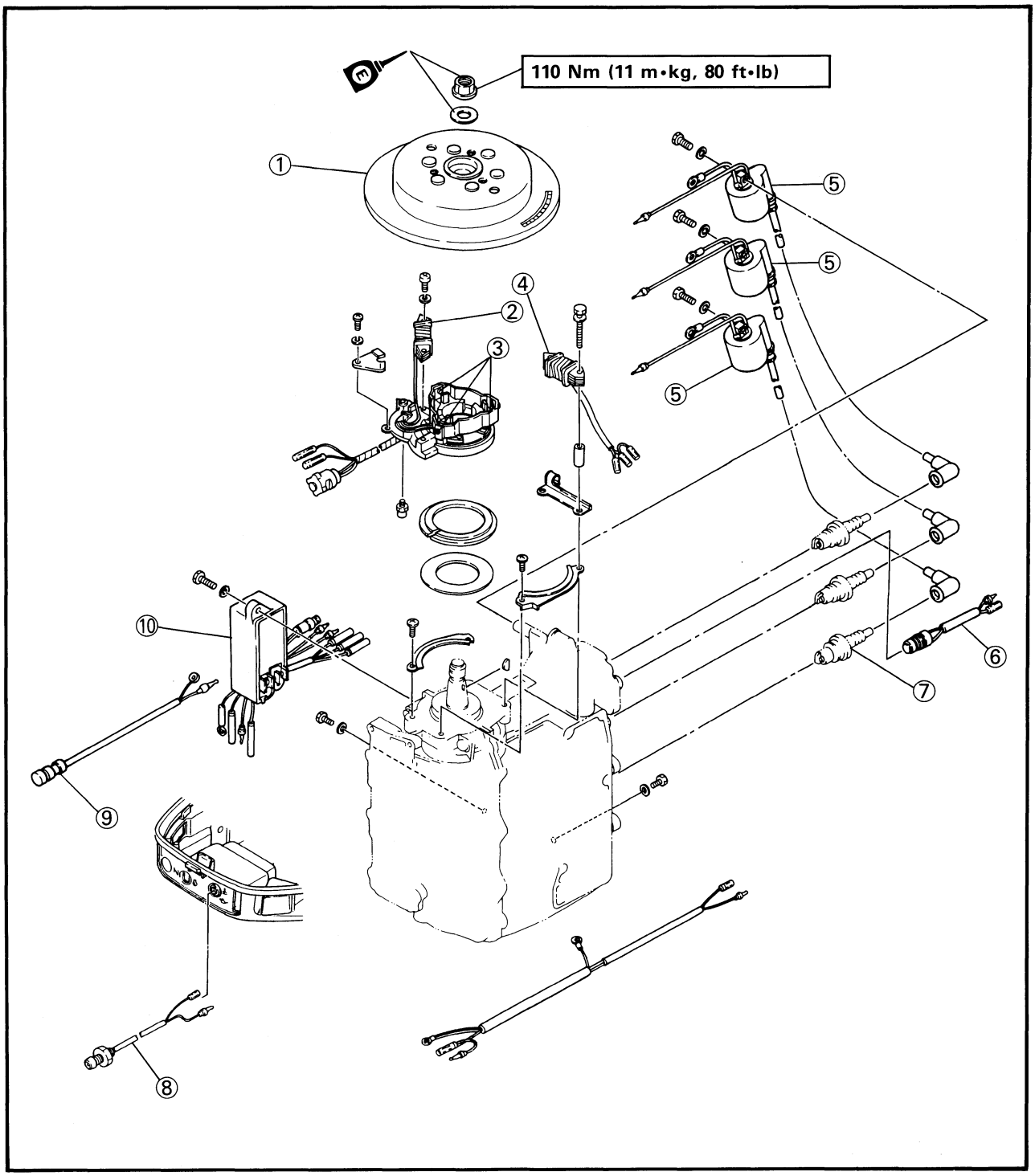
M20000-0

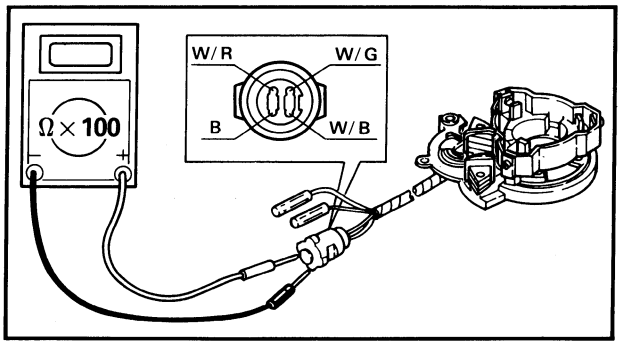
ELECTRICAL COMPONENTS

COMPONENTS 1

30MH, 30DMO		30EH, 30DEMO		30ER, 30DEO		30DRO	✓

① Rotor assembly
② Charge coil
③ Pulser coil
④ Lighting coil
⑤ Ignition coil
⑥ Thermo switch
⑦ Spark plug
⑧ Oil level warning lamp
⑨ 2P consent
⑩ C.D.I. unit



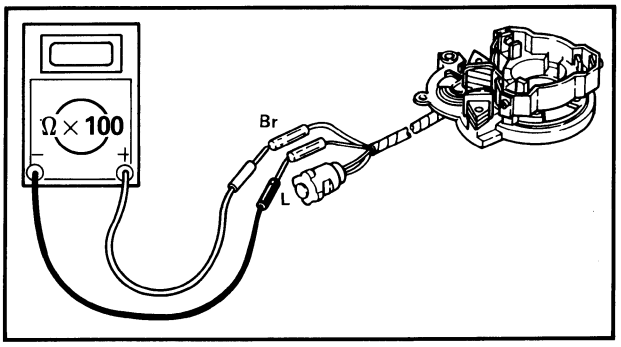


M51500-0

PULSER COIL

Check the resistance of the pulser coils.

Pulser coil resistance:
Black—White/Red:
276~415Ω
at 20°C (68°F)
Black—White/Black
276~415Ω
at 20°C (68°F)
Black—White/Black
276~415Ω
at 20°C (68°F)

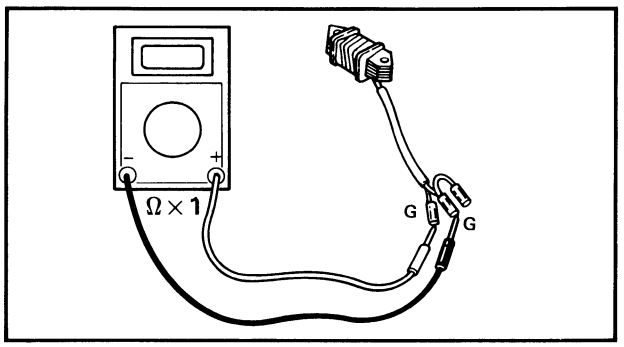


M51800-0*

CHARGE COIL

Check the resistance of the charge coil.

Charge coil resistance:
Brown—Blue
164~296Ω
at 20°C (68°F)

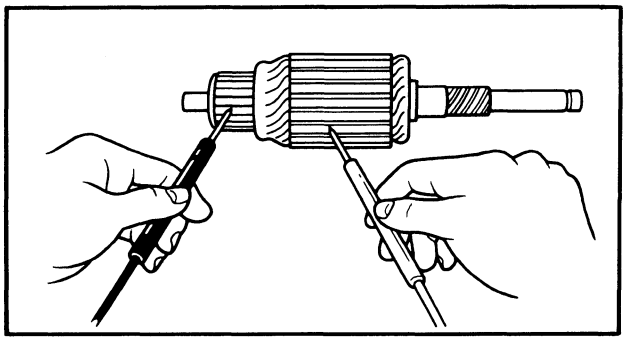


M52000-0*

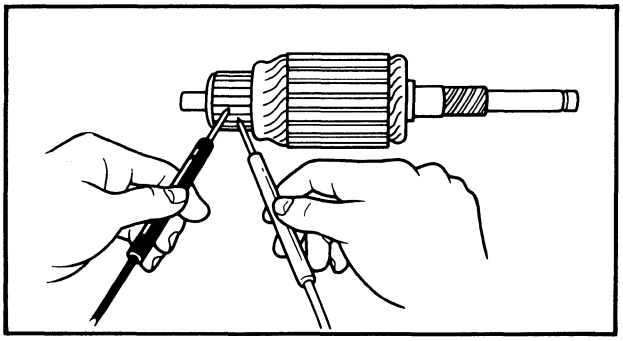
LIGHTING COIL

Check the resistance of the lighting coil.

Lighting coil resistance:
Green—Green
Standard (12V, 80W):
0.23~0.34Ω
at 20°C (68°F)



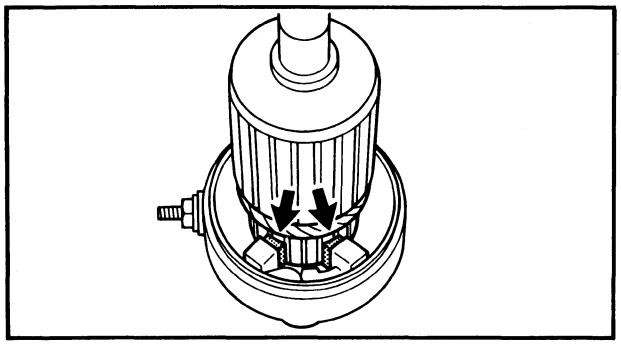
5) Check for insulation between the shaft or laminations and earth. If there is any continuity, replace the armature.



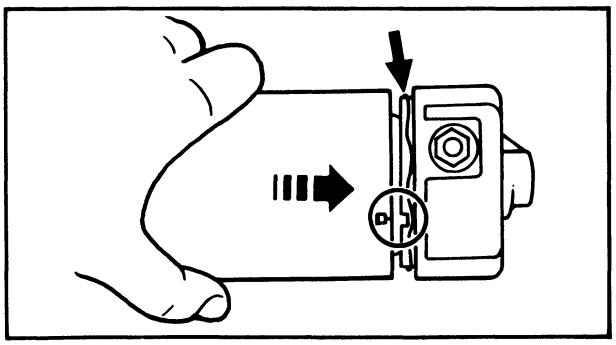
6) Inspect the commutator for open circuit by checking for continuity between segments. If any segment is not in continuity, replace the armature.

M75000-0

ASSEMBLY



1. Apply a thin coat of water resistant grease to the rear cover bushing, and install the washer (t 0.25 mm) and the armature in the rear cover assembly.

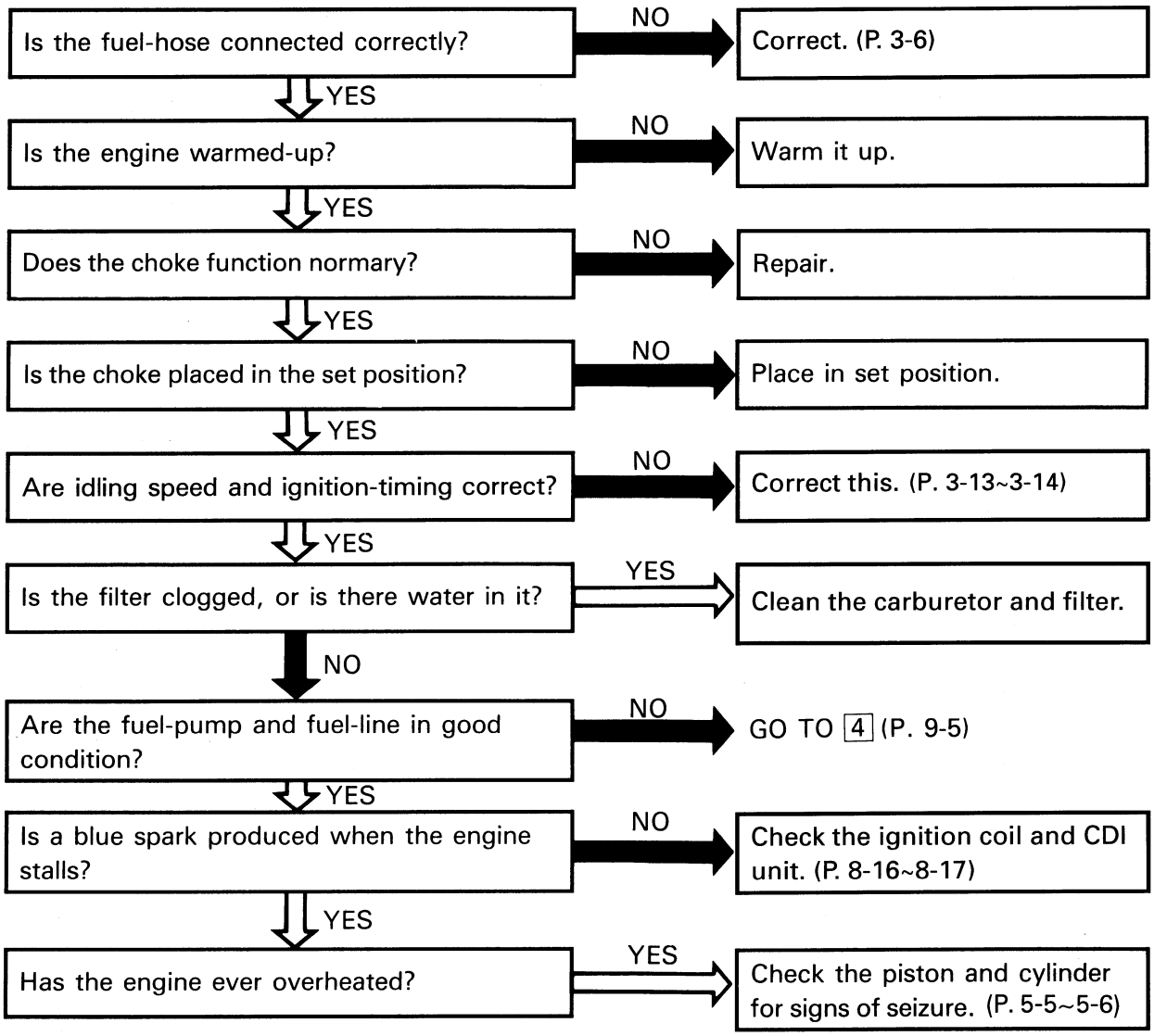


2. Assembly the starter, aligning the recess on the rear cover with the projection on the starter, and ensuring that the O-ring fits correctly in the rear cover groove.

3. Mount the washer on the armature shaft. Sparingly apply water resistant grease to the front cover bushing, ensure that the O-ring fits to the armature shaft, and insert the shaft into the front cover.

ENGINE STALLS

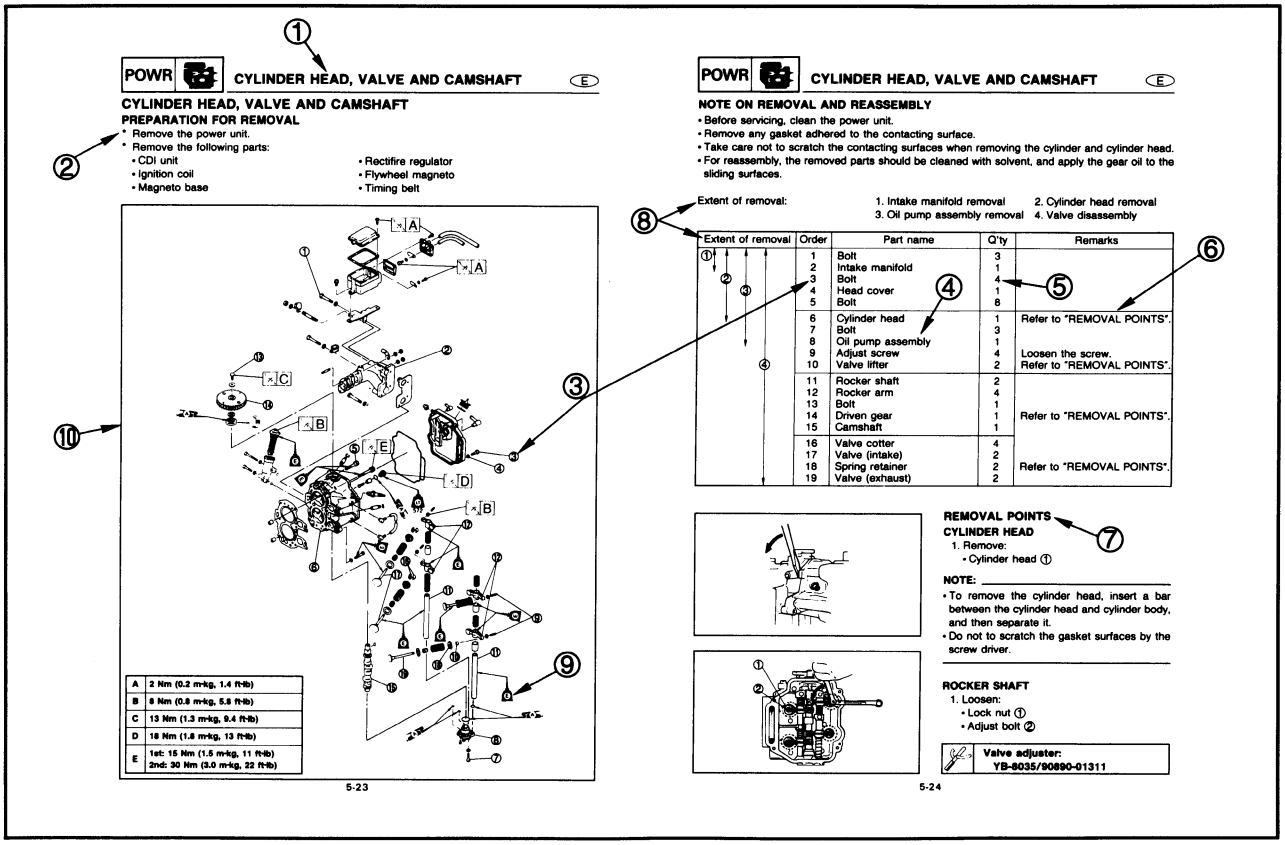
(A) The engine stalls in any gear.



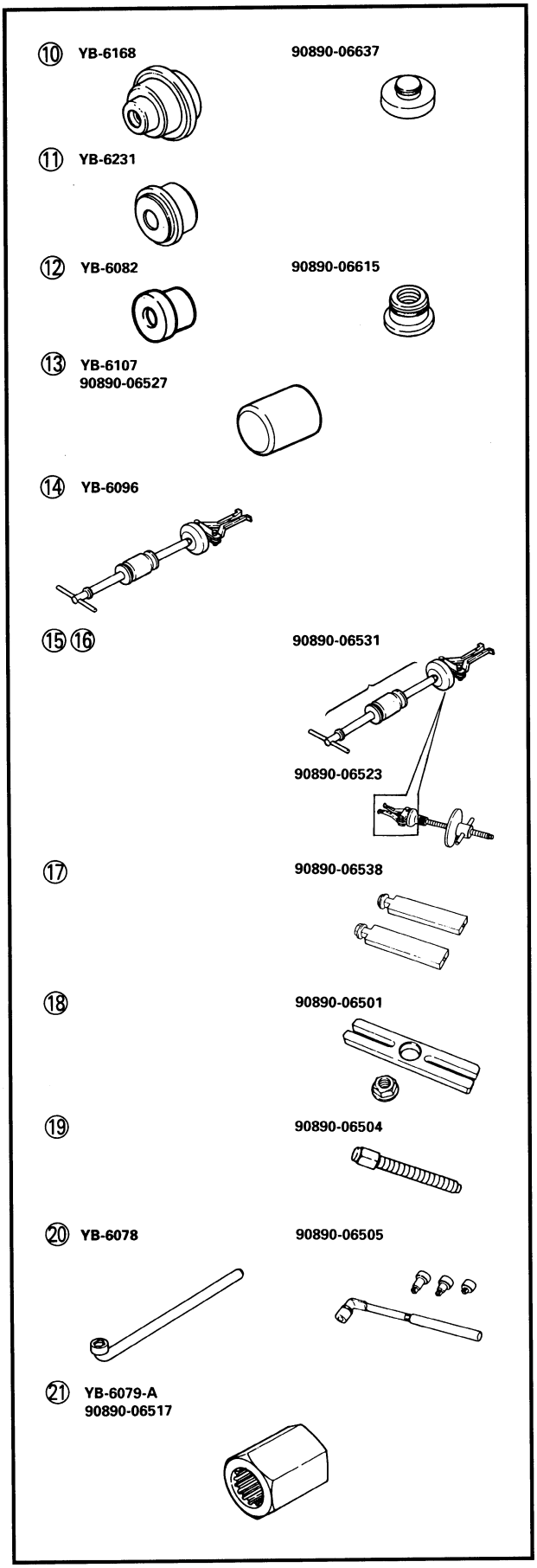
HOW TO READ DESCRIPTIONS

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 point
⑧ Extent of removal
⑨ Symbol mark
⑩ Exploded diagram



SPECIAL TOOLS



10. Oil seal installer (Ball bearing attachment)
    P/N. YB-6168, 90890-06637

11. Needle bearing plate
    P/N. YB-6231, -

12. Neddle bearing remover
    P/N. YB-6082, 90890-06615

13. Small end bearing installer
    P/N. YB-6107, 90890-06527

14. Slide hammer set
    P/N. YB-6096, -

15. Slide hammer puller claw
    P/N. - , 90890-06523

16. Slide hammer puller
    P/N. - , 90890-06531

17. Stopper guide stand
    P/N. - , 90890-06538

18. Stopper guide plate
    P/N. - , 90890-06501

19. Center bolt
    P/N. - , 90890-06504

20. Pinion nut holder
    P/N. YB-6078, 90890-06505

21. Drive shaft holder
    P/N. YB-6079-A, 90890-06517

TIGHTENING TORQUE

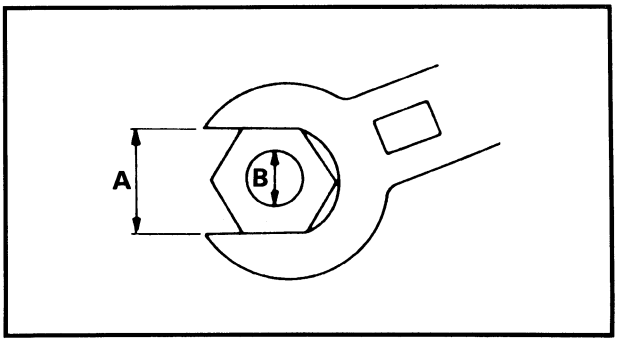
Part to be tightened		Part name	Thread size	Q'ty	Tightening torque			Remarks
					Nm	kg•m	ft•lb	
ENGINE:								
Crank case	1st	Bolt	M8	10	14	1.4	10	Apply oil
	2nd				28	2.8	20	
Cylinder head and cylinder head cover	1st	Bolt	M8	11	15	1.5	10	Apply LOC-TITE
	2nd				27	2.7	20	
Exhast cover	1st	Bolt	M6	13	4	0.4	2.9	Apply LOC-TITE
	2nd				8	0.8	5.8	
Flywheel		Nut	M16	1	140	14	100	Apply oil
Power unit mounting	1st	Bolt	M8	6	12	1.2	9	
	2nd				23	2.3	17	
Spark plug				2	25	2.5	18	
Thermostat cover		Bolt	M6	3	8	0.8	5.8	Apply LOC-TITE
Intake manifold		Bolt	M6	9	8	0.8	5.8	
Electric motor mounting		Bolt	M8	3	21	2.1	15	
UPPER CASE AND GEAR CASE:								
Clamp bracket		Nut	M22	2	45	4.5	32	
Upper side mount rubber		Nut	M10	2	17	1.7	12	
Lower front mount rubber		Bolt	M8	2	17	1.7	12	
Upper front mount rubber		Nut	M10	1	17	1.7	12	
Pinion nut		Nut	M10	1	50	5.0	36	
Bearing housing		Bolt	M6	2	11	1.1	8	
Propeller		Nut	M14	1	35	3.5	25	
Lower unit mounting	1st	Bolt	M10	4	20	2.0	14.5	
	2nd				37	3.7	27	

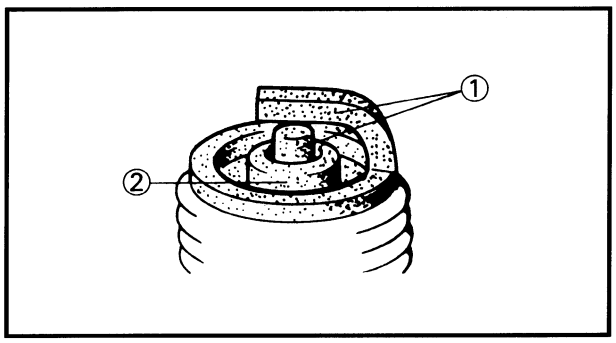
C33500-0*

GENERAL TORQUE SPECIFICATIONS

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

Nut (A)	Bolt (B)	General torque specifications		
		Nm	kg·m	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



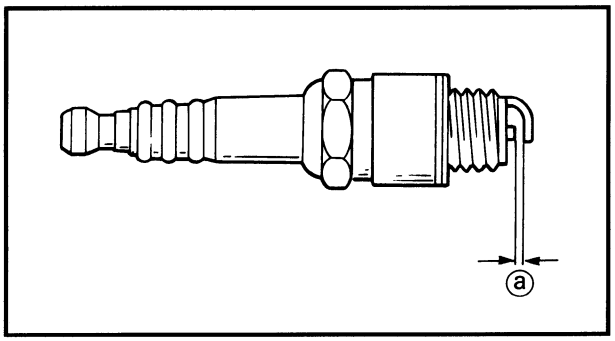


Spark plug

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

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

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

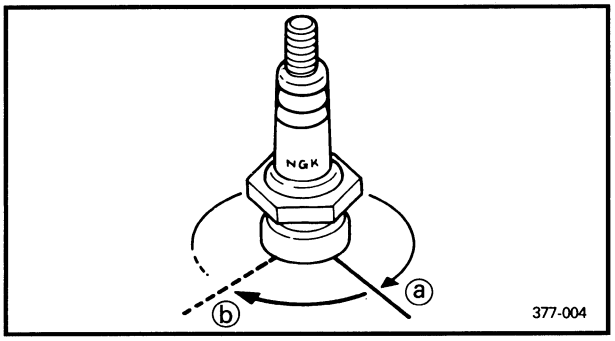


2. Clean:
   - Spark plug
     Clean the spark plug with a spark plug cleaner or wire brush.
3. Measure:
   - Spark plug gap ⓐ
     Out of specification → Alter gap.
     Use a wire gauge.

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

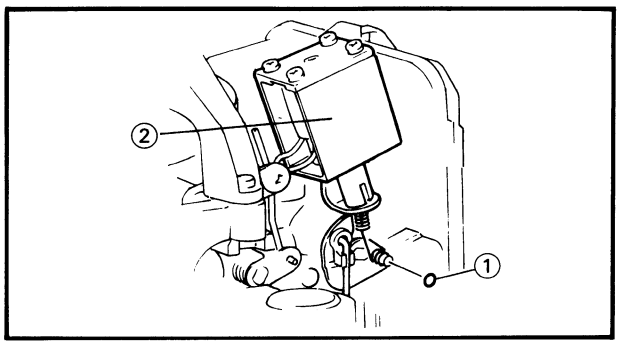
4. Tighten:
   - Spark plug

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



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



E21650-0

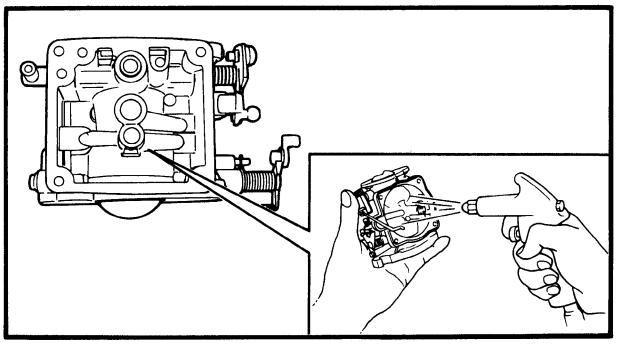
REMOVAL POINTS

Fuel enrichment solenoid

1. Remove:
   - O-ring ①
   - Fuel enrichment solenoid ②

NOTE:

Fully open the choke valve, remove the O-ring, and disconnect the pull wire from the choke lever pin.



E32050-0

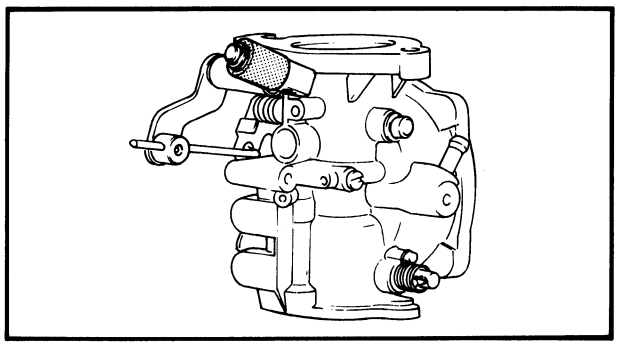
INSPECTION

Carburetor body

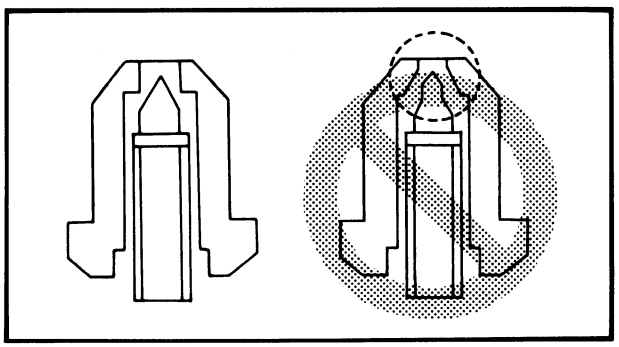
1. Inspect:
   - Carburetor body
     Crack/Damage → Replace.
     Contamination → Clean.

NOTE:

- Use a petroleum based solvant for cleaning. Blow out all passages with compressed air.
- Never use a wire.



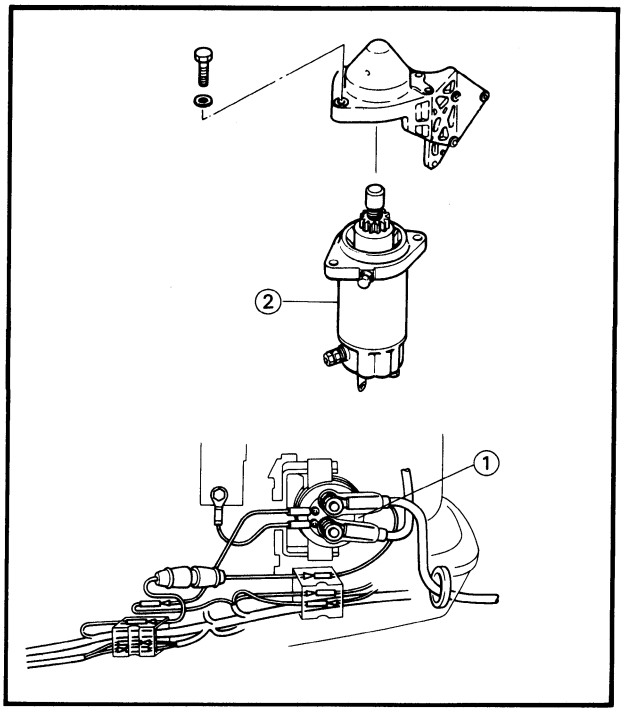
2. Inspect:
   - Collar
     Wear/Crack/Damage → Replace.



E32056-0

Needle valve

1. Inspect:
   - Needle valve
     Grooved wear → Replace.

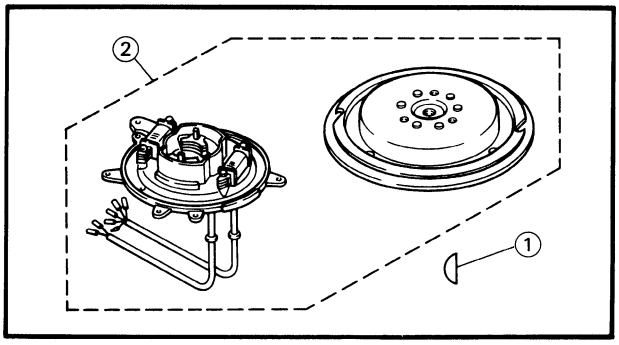


Starter motor and starter relay
[Electric starter model]

1. Install:
   - Starter relay ① (electric starter model)
   - Starter motor ② (electric starter model)

   Refer to the "ELECTRIC STARTING SYSTEM" section in CHAPTER 8.

	Bolt (starter motor): **M8: 21 Nm (2.1 kg·m, 15 ft·lb)**

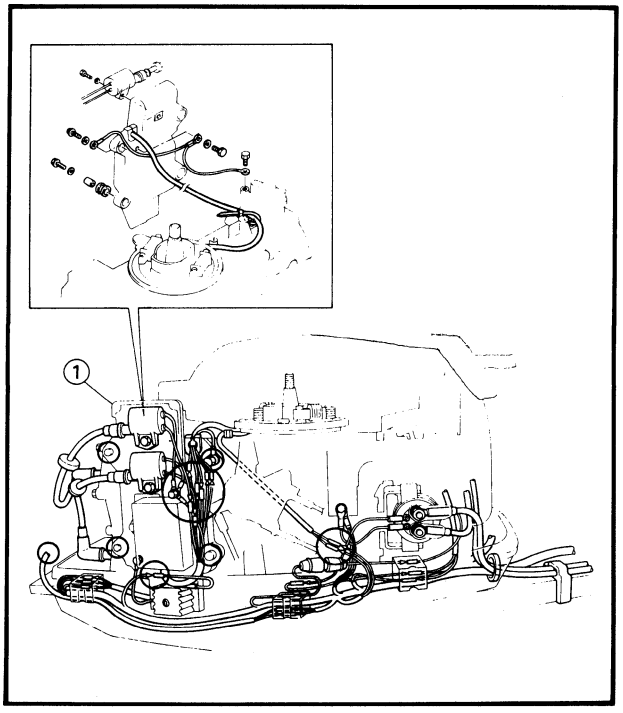


CDI magneto assembly

1. Install:
   - Woodruff key ①
   - CDI magneto assembly ②

   Refer to the "REMOVAL AND INSTALLATION" section in CHAPTER 8.

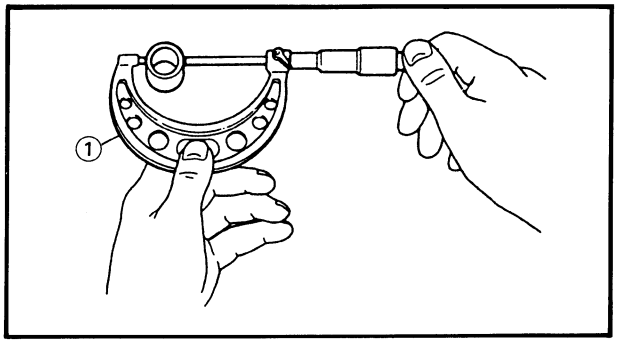
	Nut (magneto rotor): **140 Nm (14 kg•m, 100 ft•lb)**



Wiring and bracket

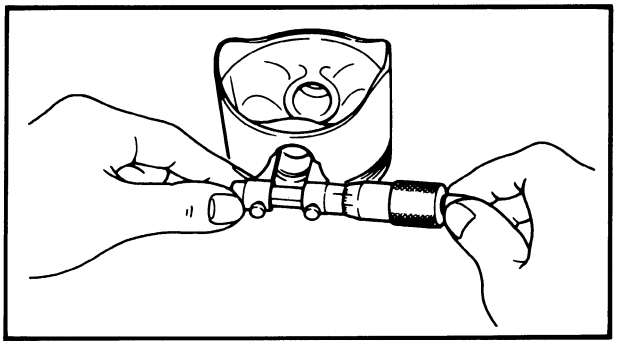
1. Install:
   - Bracket ①
   - Wiring

   Refer to the "ELECTRICAL WIRING" section in CHAPTER 8.



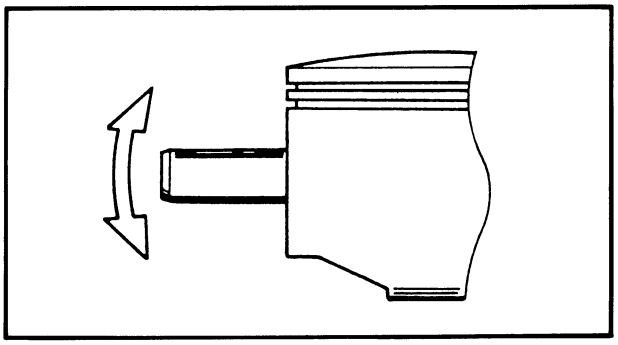
2. Measure:
   •Piston pin outside diameter
   Use a micrometer ①
   Out of specification → Replace.

Piston pin diameter:
19.895 ~ 19.900
(0.7833 ~ 0.7835 in)

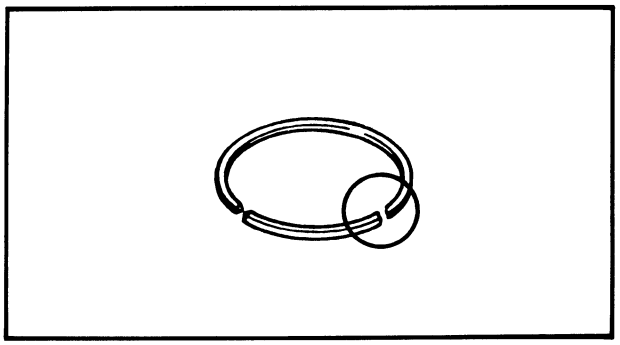


3. Measure:
   •Piston pin boss inside diameter (piston)
   Use a micro meter.
   Out of specification → Replace.

Piston pin boss inside diameter (piston):
19.904 ~ 19.915
(0.7836 ~ 0.7841)

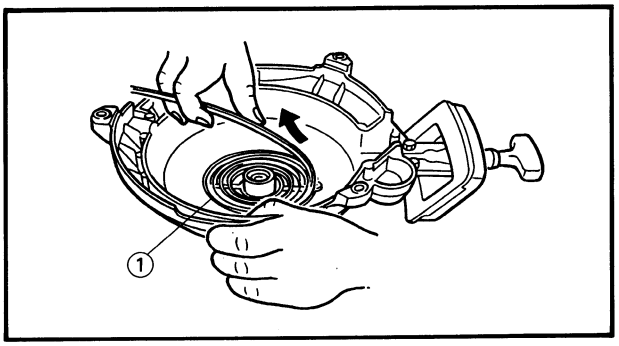


4. Check:
   •Free play (When the piston pin is in place of the piston).
   There should be no noticeable for the play.
   Free play exists → Replace the pin and/or piston.



PISTON RING

1. Inspect:
   •Piston ring
   Breakage/Damage → Replace.

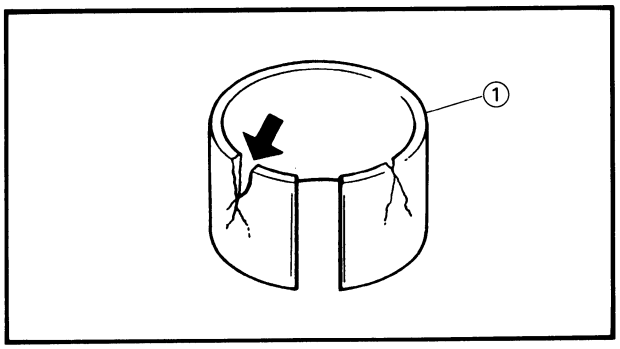


Spiral spring

1. Remove:
   - Spiral spring ①

NOTE:

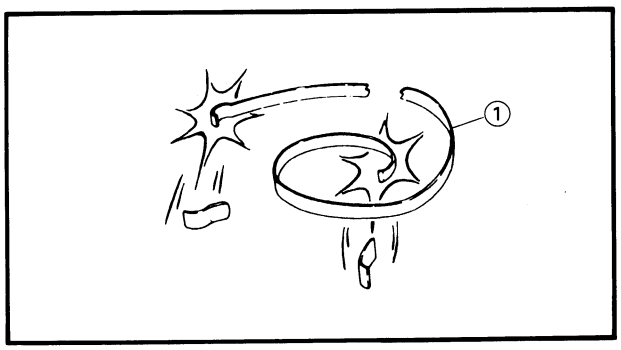
Be careful so that the spiral spring does not pop out when removing it. Remove it by allowing it out one turn of the winding each time.



INSPECTION

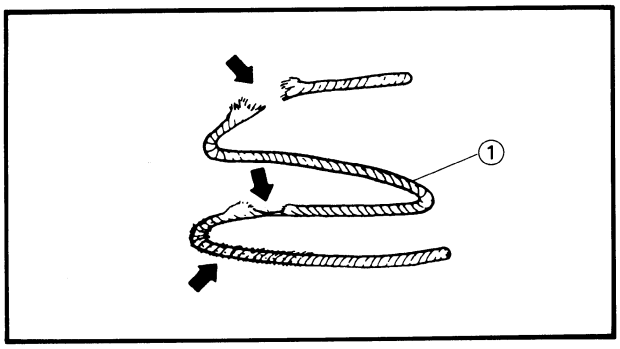
Bushing

1. Inspect:
   - Bushing ①
     Cracks/Damage → Replace.



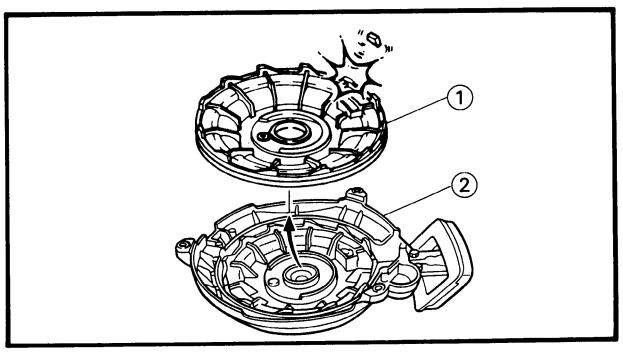
Spiral spring

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



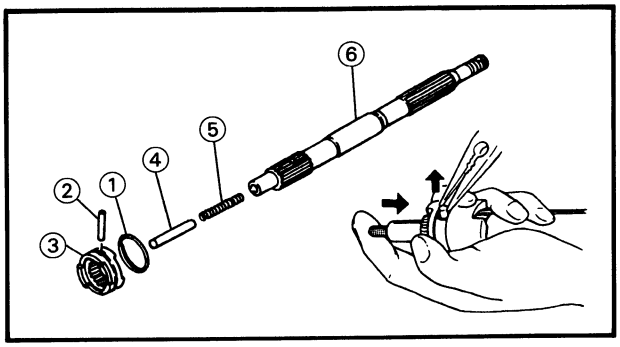
Starter rope

1. Inspect:
   - Starter rope ①
     Broken/Worn/Damage → Replace.



Sheave drum and starter case

1. Inspect:
   - Sheave drum ①
   - Starter case ②
     Cracks/Damage → Replace.

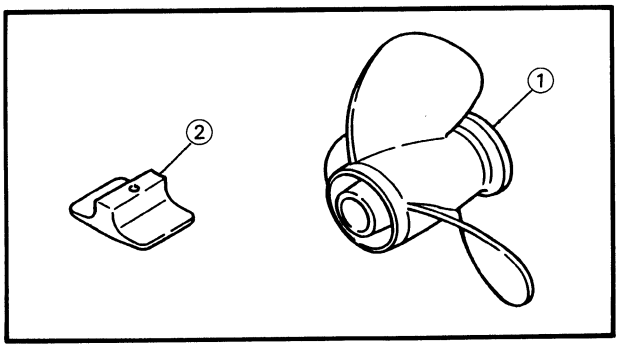


Dog clutch

1. Remove:
   - Cross pin ring ①
   - Cross pin ②
   - Dog clutch ③
   - Shift plunger ④
   - Compression spring ⑤
   - Propeller shaft ⑥

NOTE:

The cross pin is held by the compression spring. Push the dog clutch with the plunger, and pull out the straight pin.

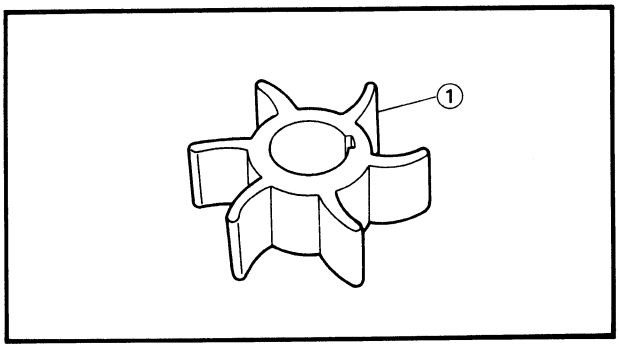


INSPECTION AND REPAIR

PROPELLER, ANODE

1. Inspect:
   - Propeller ①
   - Anode ②

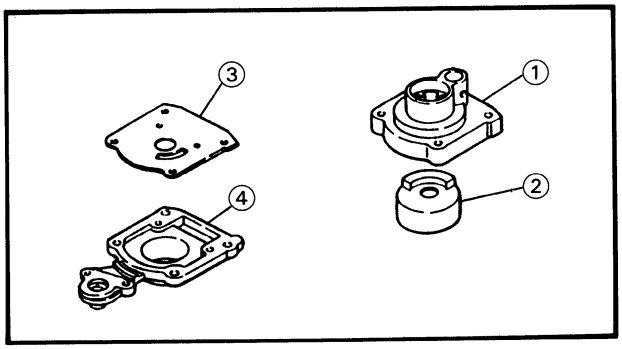
   Wear/Crack/Damage → Replace.



IMPELLER

1. Inspect:
   - Impeller ①

   Crack/Damage → Replace.



WATER PUMP HOUSING

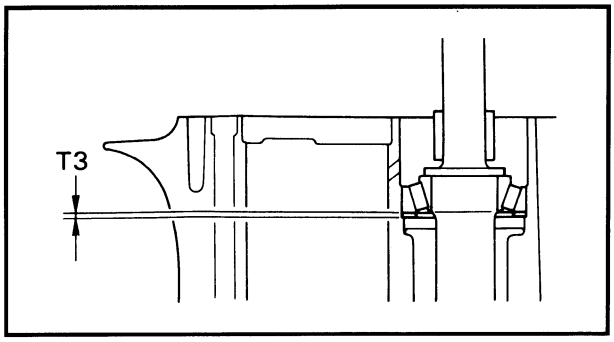
1. Inspect:
   - Water pump housing ①
   - Insert cartridge ②
   - Outer plate ③
   - Oil seal housing ④

   Crack/Damage → Replace.

•Example:
If **F** mark is " + 4", and **M** measurement is "16.25 mm"
T1 = 17.5 + (+ 4)/100 − 16.25 mm
= 17.5 + 0.04 − 16.25 mm
= 1.29 mm (0.051 in)
If **F** mark is " − 3", and **M** measurement is "16.26 mm"
T1 = 17.5 + (− 3)/100 − 16.26 mm
= 17.5 − 0.03 − 16.26 mm
= 1.21 mm (0.048 in)
•Shim sizes are supplied in following thickness:

Calculation (More ~ T_1 ~ Less)	Available shim thickness
1.00 ~ 1.10	1.0 mm
1.10 ~ 1.20	1.1 mm
1.20 ~ 1.30	*1.2 mm
1.30 ~ 1.40	1.3 mm
1.40 ~ 1.50	1.4 mm

*Selected shim (at example)



Pinion gear shim
1. Select:
•Pinion gear shim

Pinion gear shim selection steps:
•Find pinion gear shim thickness **(T3)** by selecting shims until the specified measurement **(M)** with the special service tool id obtained.

Pinion gear shim thickness (T3):
T3 = M mm − 27 mm − P/100 mm

NOTE:
If the **P** value is negative (−), then **add** the **P** value from the measurement.

GEAR BACKLASH MEASUREMENT

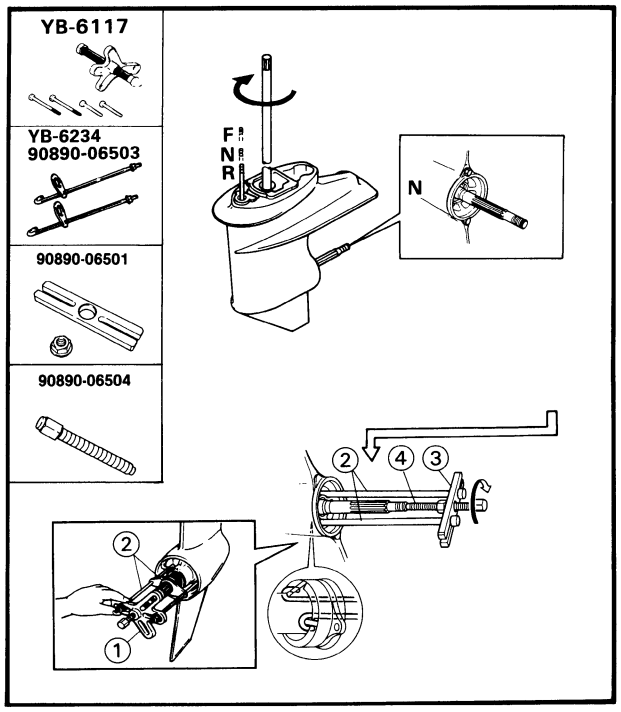
NOTE:

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

Forward gear

1. Measure:
   - Forward gear backlash
     Out of specification → Adjust.

Backlash (forward gear):
0.31 ~ 0.72 mm
(0.012 ~ 0.028 in)



Measuring steps:

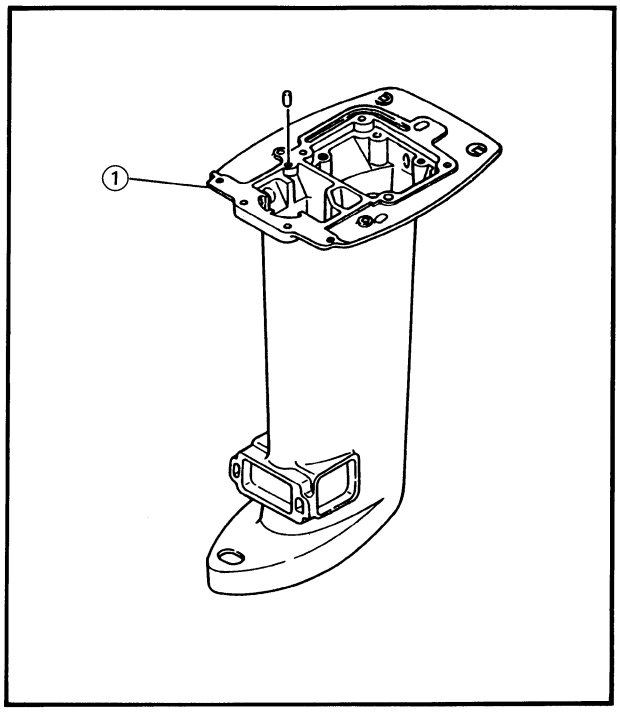
- Place the shift cam in neutral.
- Load the forward gear with the bearing housing puller on the propeller shaft.
  Using the special service tool.

NOTE:

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

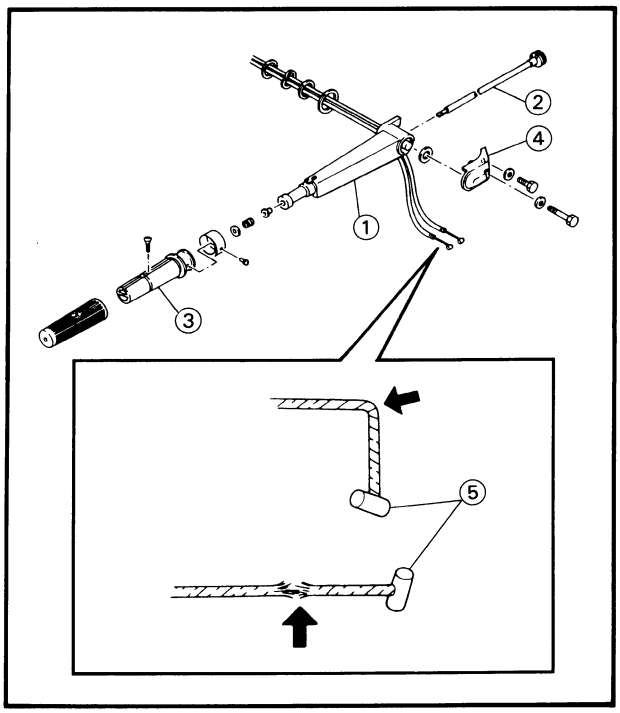
Universal puller ①:
YB-6117, -
Bearing housing puller ②:
YB-6234, 90890-06503
Stopper guide plate ③:
-, 90890-06501
Center bolt ④:
-, 90890-06504

UPPER CASING AND BOTTOM COWLING



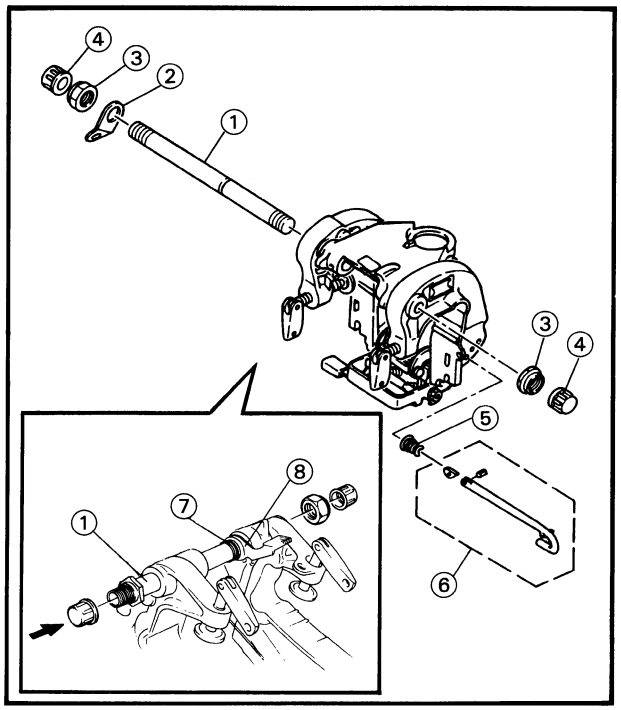
Upper casing

1. Inspect:
   - Upper casing ①
     Crack/Damage → Replace.



Steering handle

1. Inspect:
   - Steering handle ①
   - Throttle lever ②
   - Steering handle grip ③
   - Steering handle ④
     Crack/Damage → Replace.
   - Throttle cable ⑤
     Bent/Broken → Replace.

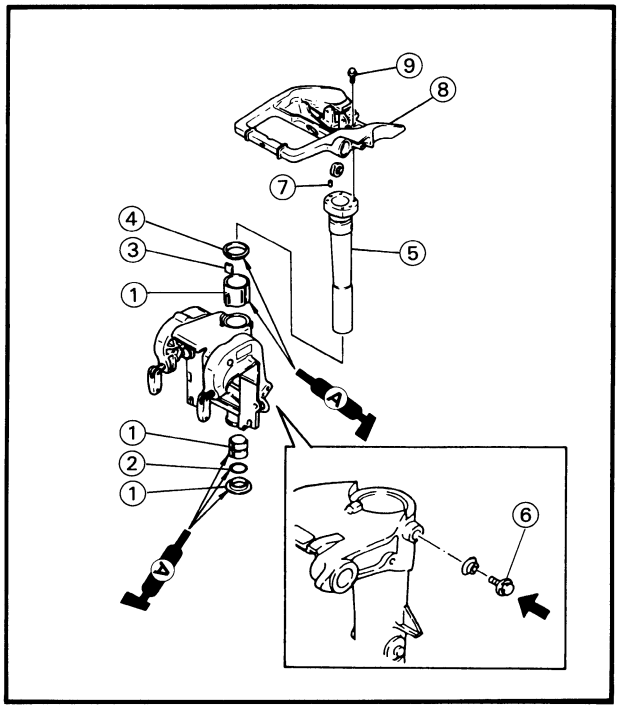


3. Install:
   - Clamp bracket bolt ①
   - Clamp bracket plate ②
   - Nut ③
   - Clamp bracket cap ④
   - Conical spring ⑤
   - Tilt pin ⑥

NOTE:

Pass the clamp bracket bolt through the spring ⑦ and the tilt lever ⑧.

	Nut: **45 Nm (4.5 kg•m, 32 ft•lb)**



Steering bracket

1. Install:
   - Bush ①
   - O-ring ②
   - Friction plate ③
   - Washer ④
   - Steering pivot shaft ⑤
   - Bolt ⑥
   - Dowel pin ⑦
   - Steering bracket ⑧
   - Bolt ⑨

NOTE:

- Always use the new O-ring.
- Apply water resistant grease to the bush, O-ring and the grease nipples.
- After installing the steering bracket make sure the movement of steering pivot shaft by moving it.

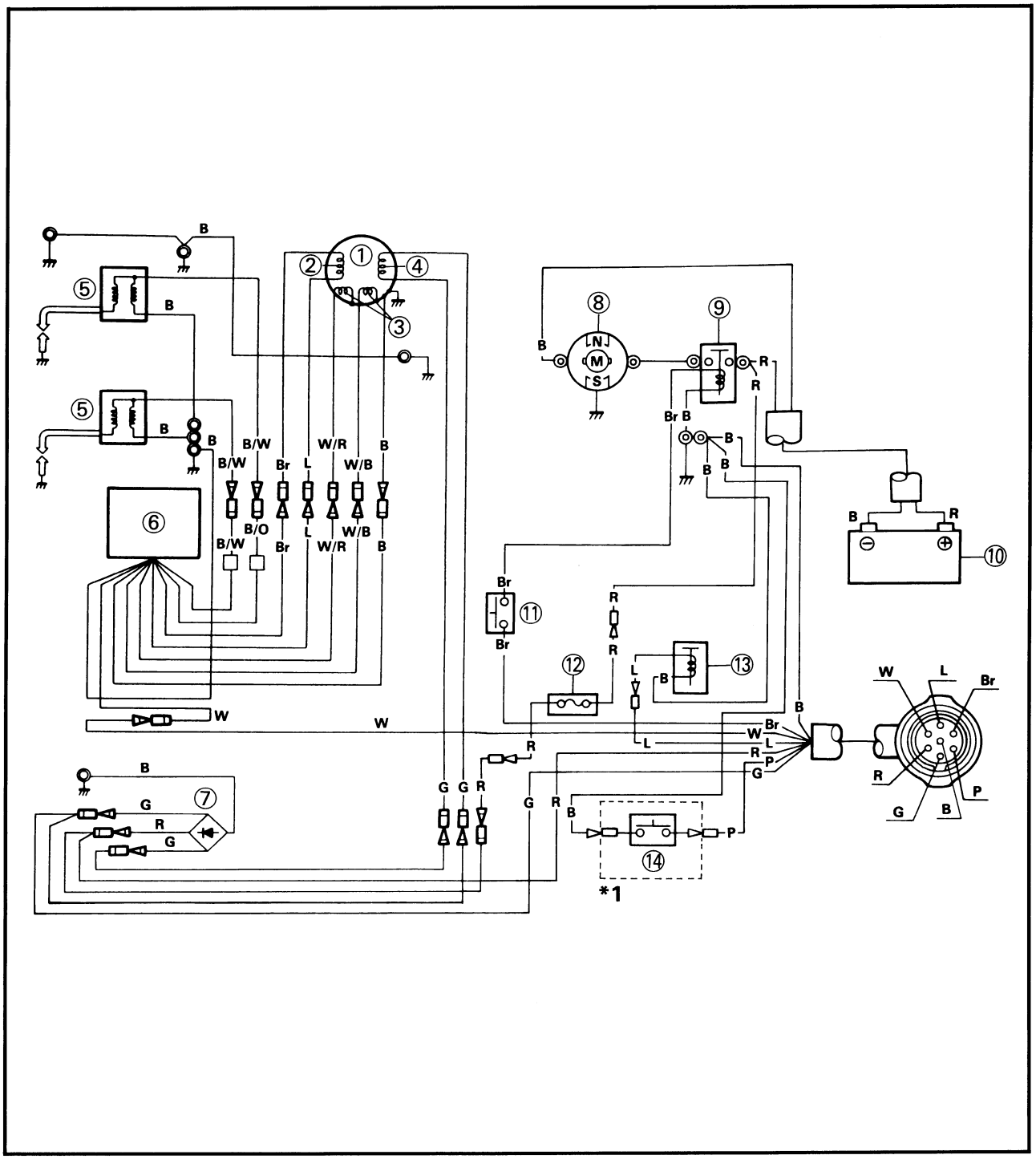
WIRING DIAGRAM

C25MH		—		C30MH		C30ER	✓
25VM		25VE	✓	30GM		30GE	✓

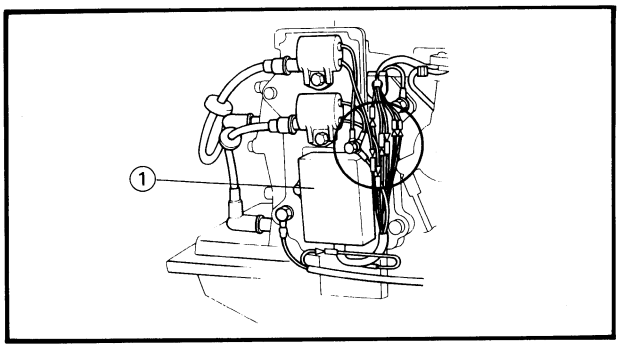
① CDI magneto
② Charge coil
③ Pulser coil
④ Lighting coil
⑤ Ignition coil
⑥ CDI unit
⑦ Rectifire
⑧ Starter motor
⑨ Starter relay
⑩ Battery
⑪ Neutral switch
⑫ Fuse
⑬ Fuel enrichment solenoid
⑭ Thermo switch *1

B : Black
Br : Brown
G : Green
L : Blue
P : Pink
R : Red
W : White
B/O : Black/Orange
B/W : Black/White
W/B : White/Black
W/R : White/Red

*1 : Except for 25VE model



IGNITION SYSTEM INSPECTION



CDI UNIT

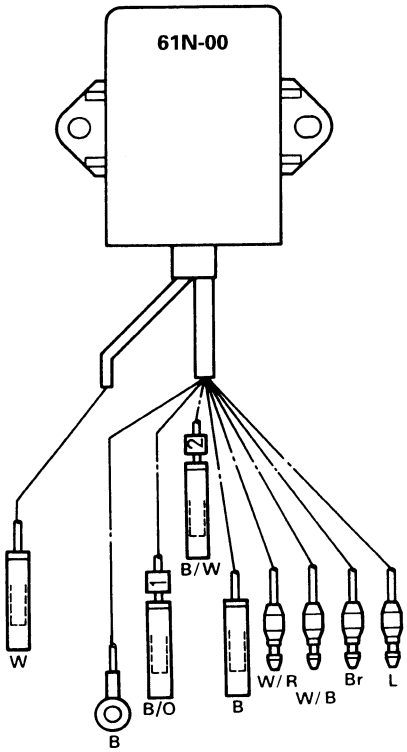
1. Measure:
   - CDI unit ① resistance
     Out of specification → Replace.

NOTE:

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

Pocket tester:
YU-03112, 90890-03112

CDI unit:
Resistance

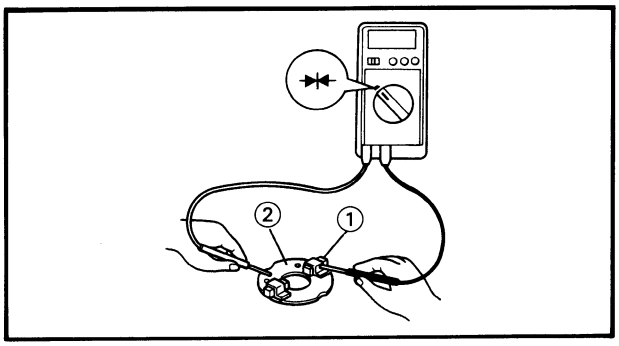


Unit: kΩ

Tester ⊕ \ ⊖ Tester		Stop	Ground	Ignition		Ground	Pulser		Charge	
		W	B	B/O	B/W	B	W/R	W/B	Br	L
Stop	W		∞	∞	∞	∞	∞	∞	∞	∞
Ground	B	3.5~7.0		2.7~6.2	2.7~6.2	0	∞	∞	3.0~7.0	3.0~7.0
Ignition	B/O	∞	∞		∞	∞	∞	∞	∞	∞
	B/W	∞	∞	∞		∞	∞	∞	∞	∞
Ground	B	3.5~7.0	0	2.7~6.2	2.7~6.2		∞	∞	3.0~7.0	3.0~7.0
Pulser	W/R	∞	∞	18~36	∞	∞		∞	∞	∞
	W/B	∞	∞	∞	18~36	∞	∞		∞	∞
Charge	Br	70~160	53~88	75~145	75~145	53~88	∞	∞		75~145
	L	70~160	53~88	75~145	75~145	53~88	∞	∞	75~145	

∞ : No continuity

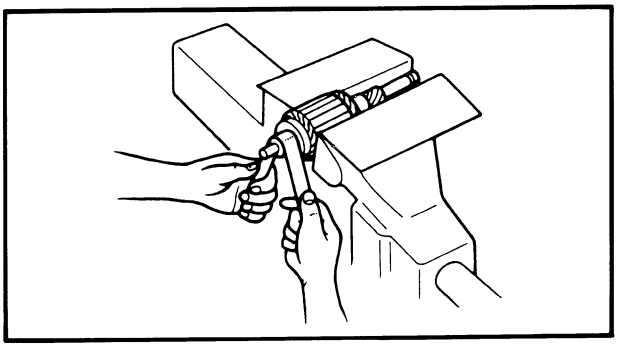
W : White
B : Black
B/O : Black/Orange
B/W : Black/White
B : Black
W/R : White/Red
W/B : White/Black
Br : Brown
L : Blue



Brush holder

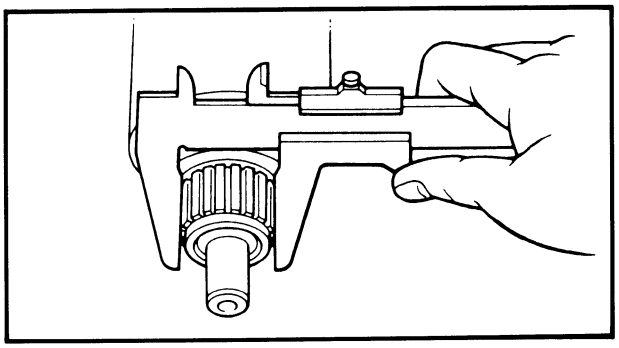
1. Check:
   - Brush holder continuity
     Out of specification → Replace.

Brush holder continuity:	
	Good condition
Positive brush holder — Earth	Discontinuity



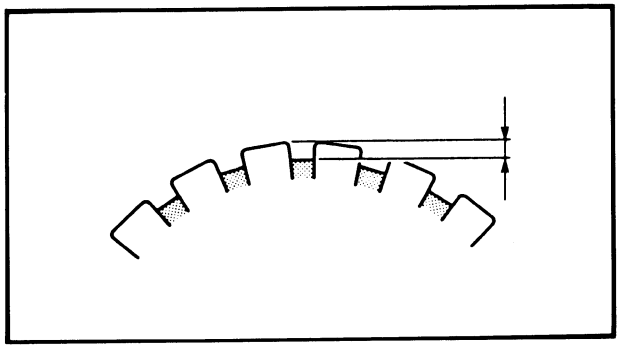
Armature

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



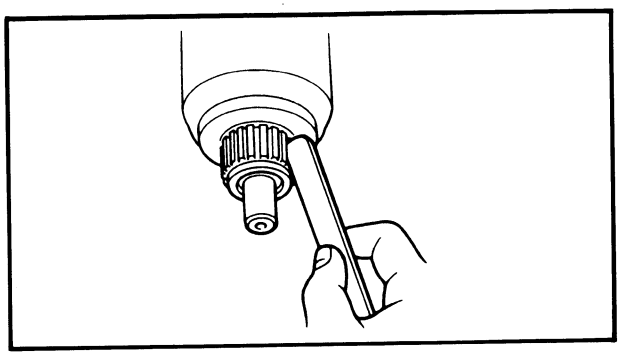
2. Measure:
   - Commutator diameter
     Out of specification → Replace.

Commutator diameter limit:
29.0 mm (1.14 in)



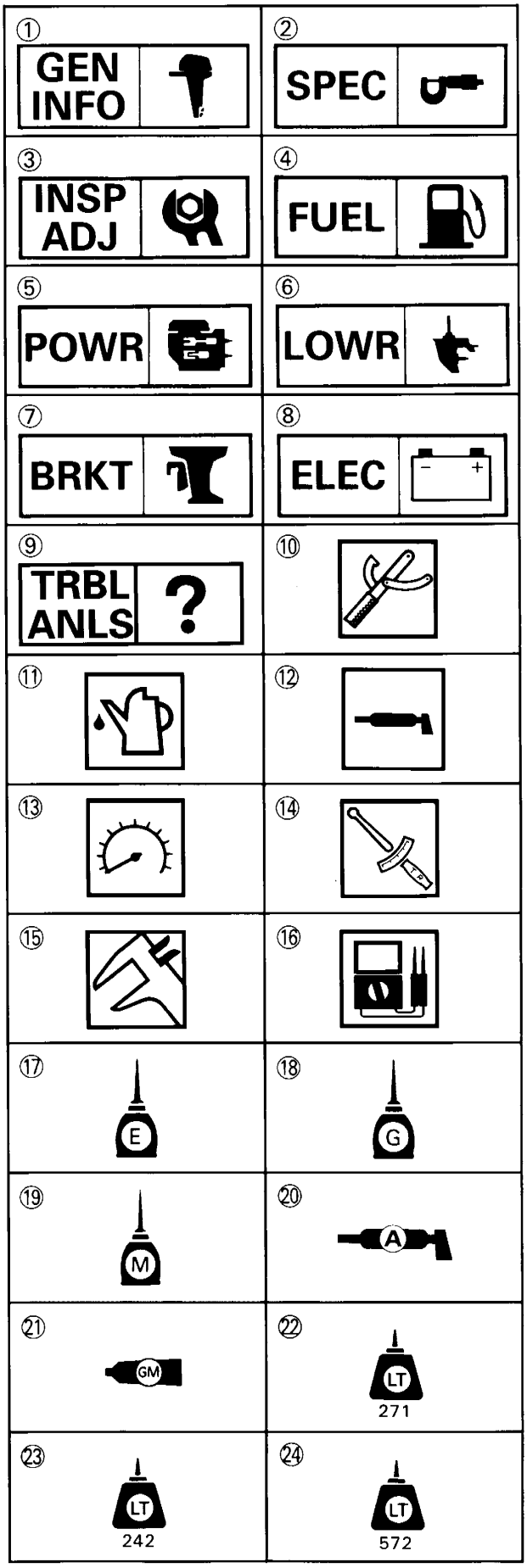
3. Measure:
   - Mica undercut depth
     Out of specification → Cut it until specified depth is obtained.

Mica undercut depth:
0.5 ~ 0.8 mm (0.02 ~ 0.03 in)
<Repair limit>
0.2 mm (0.008 in)



NOTE:

Remove all particles of mica and metal by compressed air.



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SYMBOLS

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

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

Symbols ⑩ to 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 valve
[Resistance (Ω), Voltage (V), Electric current (A)]

Symbol ⑰ to ⑳ in an exploded diagram indicate grade of lubricant and location of lubrication point:

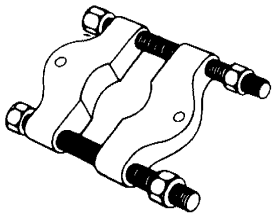
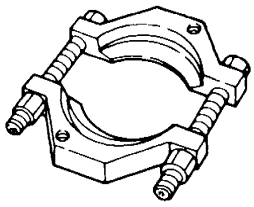
⑰ Apply engine oil
⑱ Apply gear oil
⑲ Apply molybdenum disulfide oil
⑳ Apply water resistant grease (Yamaha marine grease A, Yamaha marine grease)

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

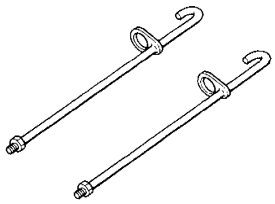
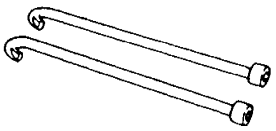
㉑ Apply Gasket Maker®
㉒ Apply LOCTITE® No. 271 (Red LOCTITE)
㉓ Apply LOCTITE® No. 242 (Blue LOCTITE)
㉔ Apply LOCTITE® No. 572

NOTE:

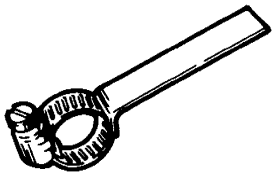
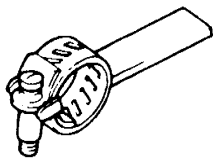
In this manual, the above symbols may not be used in every case.

YB-6219	90890-06534
	

7. Bearing separator
   P/N. YB-6219
   90890-06534

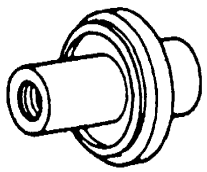
YB-6234	90890-06503
	

8. Bearing housing puller
   P/N. YB-6234
   90890-06503

YB-6265	90890-06265
	

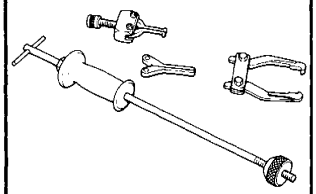
9. Backlash indicator
   P/N. YB-6265
   90890-06706

YB-6270-A



10. Forward and reverse gear bearing installer
    P/N. YB-6270-A

YB-6096



11. Slide hammer set
    P/N. YB-6096

Item	Unit	Model	
		25hp	30hp
Lubrication system:			
Oil injection pump			
Stamped mark		6J801	
Specified discharge 3 min/each port Engine 1,500 rpm	cm^3 (Imp oz, US oz)	0.7 ± 0.3 (0.025 ± 0.011, 0.024 ± 0.010)	
Reed valve:			
Valve stopper height	mm (in)	2.65 ± 0.15 (0.10 ± 0.006)	
Maximum reed warp	mm (in)	0.2 (0.01)	

ELECTRICAL (1)

Item	Unit	Model	
		25hp	30hp
Ignition system:			
Ignition timing (at full retarded)	ATDC degree	5 ± 1	
Ignition timing (at full advanced)	BTDC degree	25 ± 1	
Piston position (at full advanced)	BTDC mm (in)	3.55 ± 0.27 (0.14 ± 0.011)	
Ignition timing cam roller pick up	ATDC degree	3 ± 1	2 ± 1
CDI output peak voltage (minimum)	V @ cranking	130	
	V @ 1,500 r/min	180	
	V @ 3,500 r/min	120	
Charge coil output peak voltage (minimum)	V @ cranking	155	
	V @ 1,500 r/min	200	
	V @ 3,500 r/min	130	
Pulser coil output peak voltage (minimum)	V @ cranking	4	
	V @ 1,500 r/min	11	
	V @ 3,500 r/min	20	
Lighting coil output peak voltage (minimum)	V @ cranking	8	
	V @ 1,500 r/min	20	
	V @ 3,500 r/min	40	
Spark plug			
Spark plug gap (Standard and noise suppressor)		0.9 ~ 1.0 (0.035 ~ 0.039)	

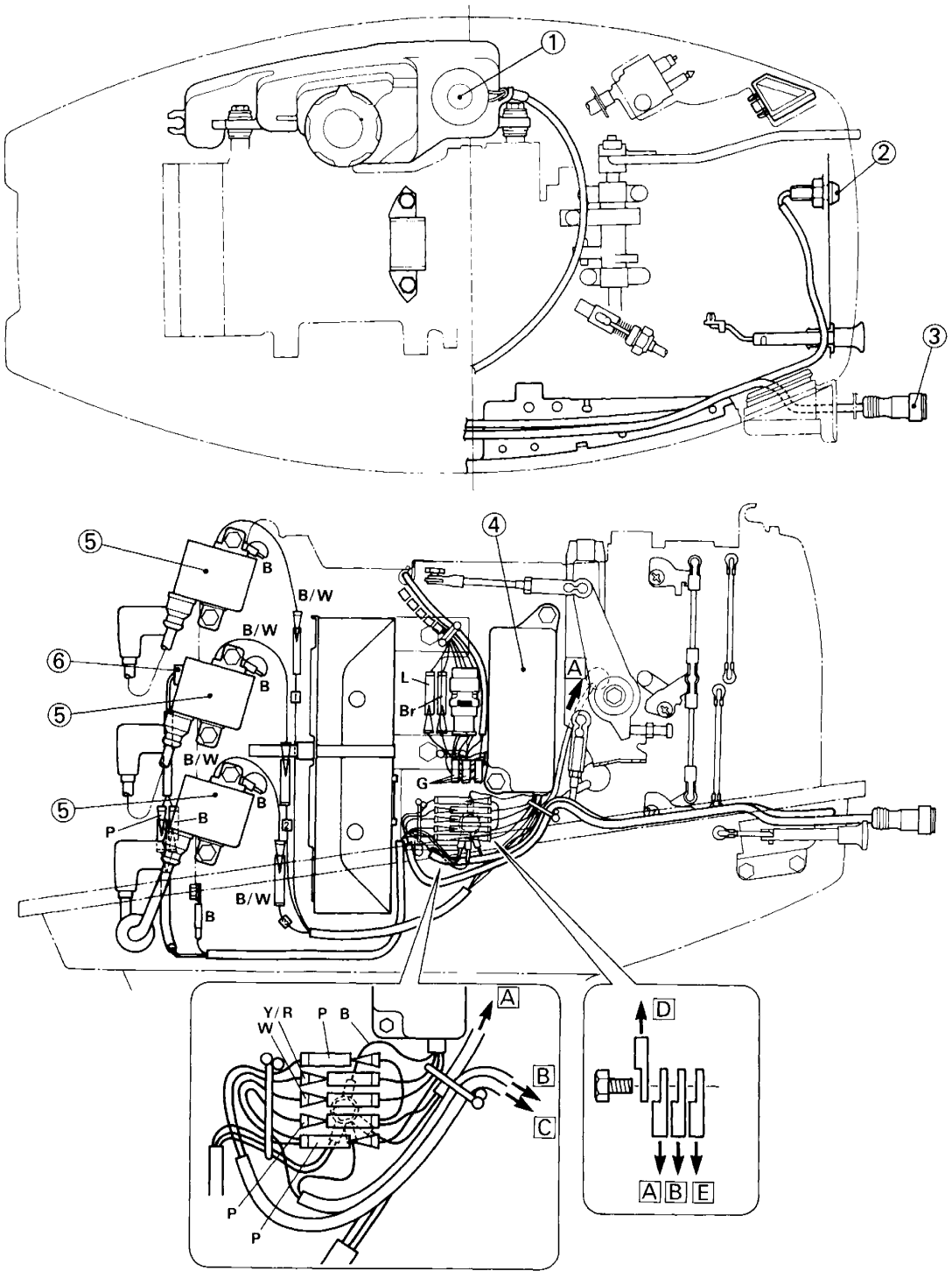
D22002-0

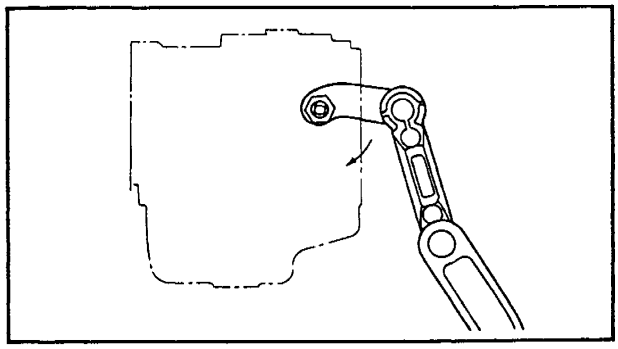
30DRO

① Oil level gauge
② Oil level warning lamp
③ 2P concent
④ C.D.I. unit
⑤ Ignition coil
⑥ Thermo switch

[A] To oil level gauge
[B] To 2P concent
[C] To oil level warning lamp
[D] To C.D.I. unit
[E] To thermo switch

B : Black
Br : Brown
G : Green
L : Blue
P : Pink
R : Red
W : White
Y : Yellow
O : Orange

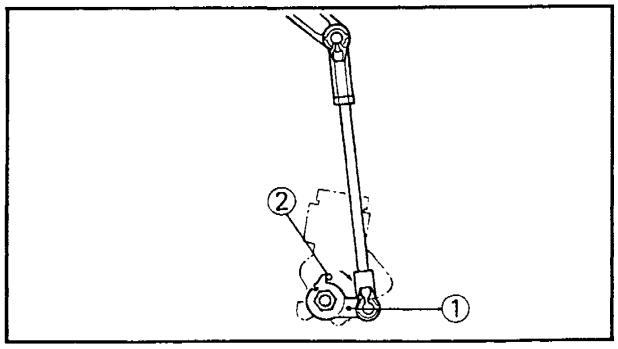




D34300-1

OIL PUMP LINK ADJUSTMENT

1) Fully-open the carburetor throttle valve.



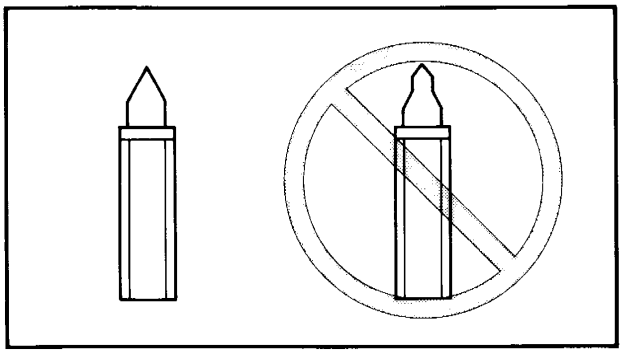
2) Turn the oil pump lever ① toward full-open position until it contacts to stopper ②, adjust the length of the rod connecting the oil-pump to the carburetor, and tighten the locknut.
3) Install the connecting-rod.
4) By operating the carburetor, check the throttle-valve opens fully.

E32002-0

INSPECTION

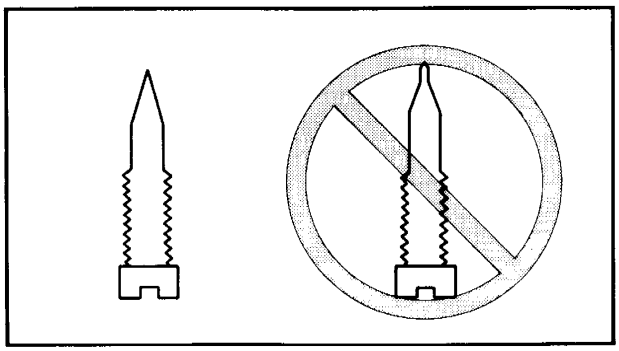
Carburetor body

1) Inspect the carburetor body for cracks or clogging of the passages.



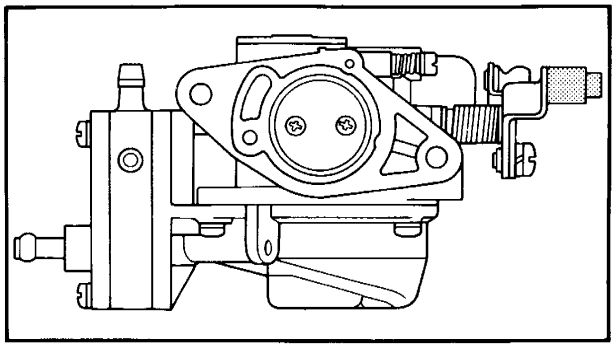
Needle valve

1) Inspect the needle valve for free movement and wear, and replace if required.



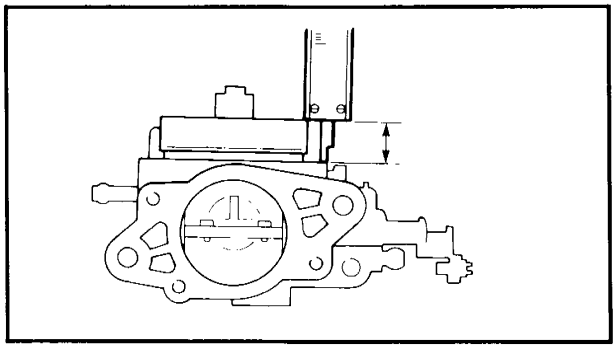
Pilot screw

1) Inspect the needle valve for wear, and replace if required.



Collar

1) Inspect the collar at the end of the accelerator-arm for wear, and replace if required.



Float

1) Visually inspect the float for damage or cracks, and replace if required.
2) Measure the float height. If it is more than 1 mm (0.039in) greater or less than the specified float height, replace the valve seat and needle-valve.

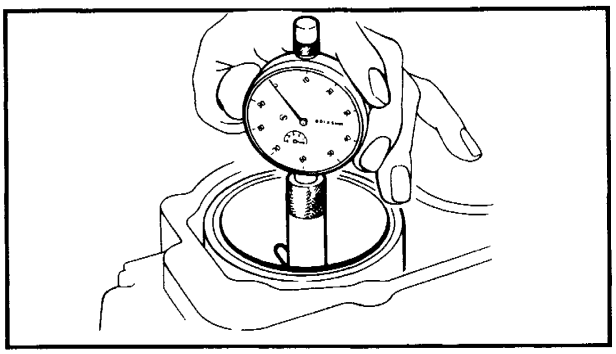
Float height:
25hp: 16±0.5 mm (0.63±0.02 in)
30hp: 15±0.5 mm (0.59±0.02 in)

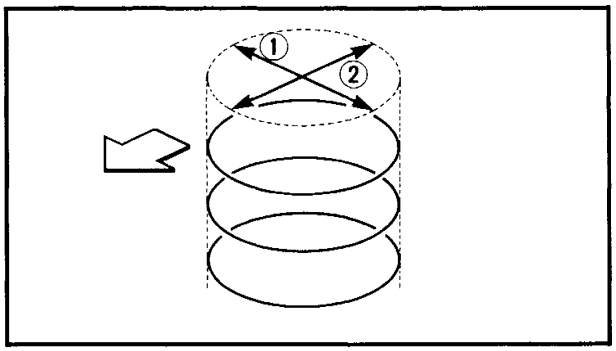
G61500-0

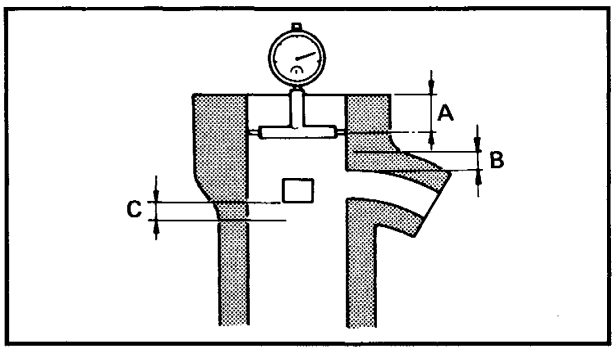
CYLINDER BLOCK

Cleaning

1) Using a gasket-scraper, remove all traces of gasket material from the cylinder-block surface.
2) Using a soft brush and solvent, clean the cylinder-block.







Inspection

1) Visually inspect the cylinder sleeves for cracks and scratches.
   If cracks are found, replace the cylinder block.
   If scratches are found, check the degree of out-of-round, and then hone the cylinder or re-bore it if necessary.
2) Using a cylinder-gauge, measure the cylinder bore at three positions in the thrust and axial directions.

① Axial direction
② Turust direction

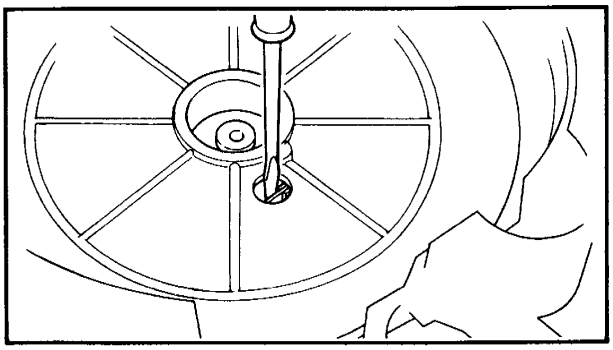
Cylinder bore size:
59.50 ~ 59.52 mm
(2.3425 ~ 2.3433 in)
Taper limit:
0.08 mm (0.003 in)
Out of round limit:
0.05 mm (0.002 in)

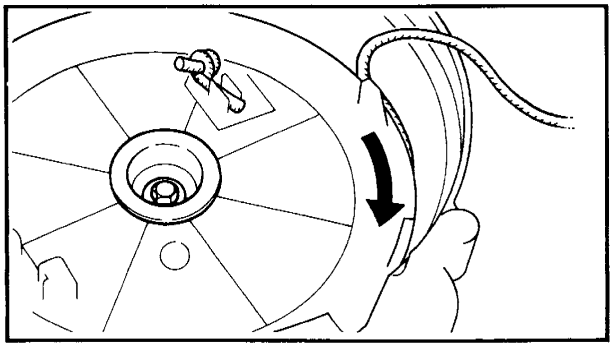
If diameter is greater than the limit, hone or rebore all cylinders or, if necessary, replace the cylinder-block

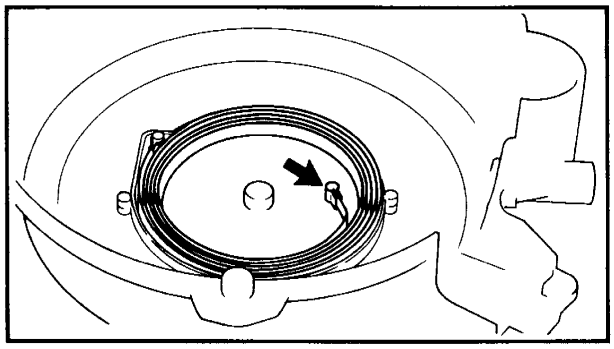
A: 10 mm (0.4 in) below the cylinder top
B: 5 mm (0.2 in) above the exhaust port
C: 5 mm (0.2 in) below the scavanging port

NOTE:

Do not place the cylinder-gauge in the port hole.







REMOVAL AND DISASSEMBLY

1) Remove and disassemble the recoil starter referring to the exploded diagram. Note the following points.
   - Remove the start-in-gear protection device at the recoil starter.
   - When removing the starter rope, insert a screwdriver into the starter stop-plunger hole to secure the sheave-drum from running off.
   - Slowly turn the sheave-drum clockwise to spring-free, and remove the sheave-drum.

NOTE:

When removing the sheave drum, hold down the starter spring so that the starter spring will not spring out.

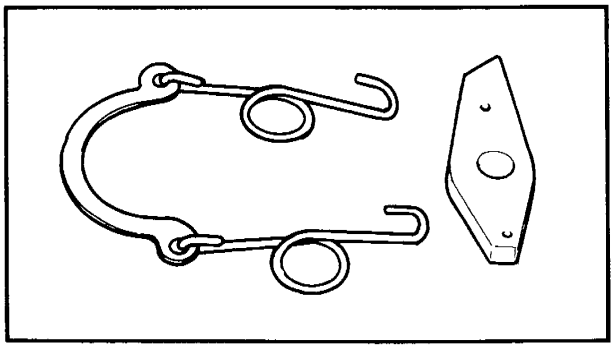
⚠ WARNING

Wear suitable protective gloves and take care to protect yourself from an accident due to the spring flying out when removing the sheave drum.

   - Holding the spring with one hand, unfold the spring from its center with the other. Be careful the spring does not jump out.

⚠ WARNING

When removing or installing the starter spring, use care not to injure your hand. It is advisable to wear gloves.

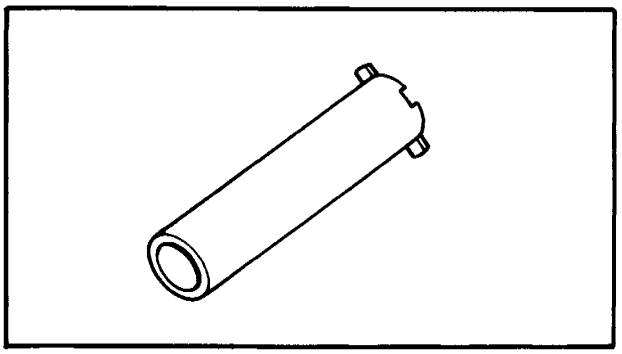


H12000-0

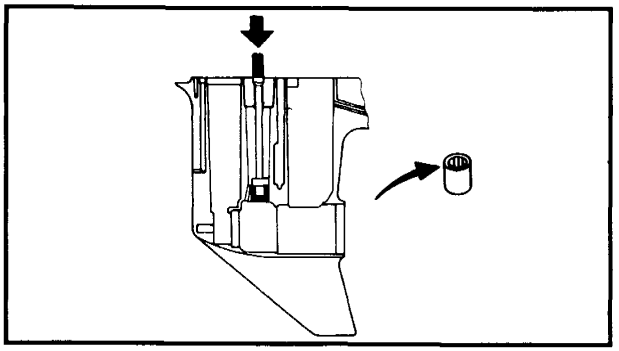
INSPECTION

Drive pawl and spring

1) Visually inspect the drive pawl for breaks bends, or wear and, if these are found, replace them.

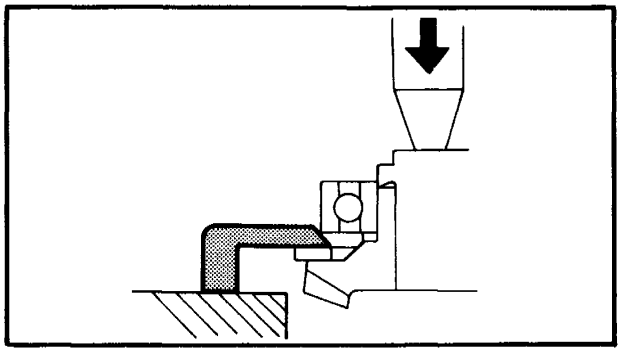


16. Drive shaft sleeve.



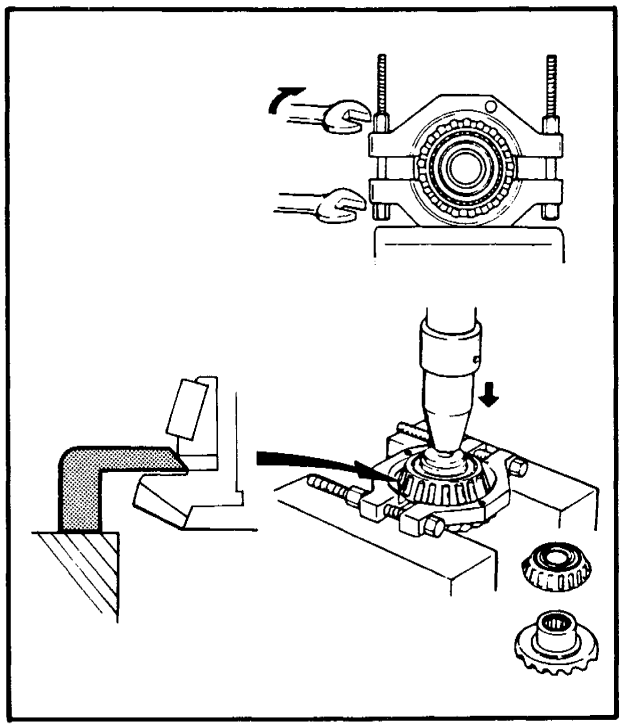
17. Drive shaft needle bearing
    Using special service tool

Drive rod:
YB-6229/90890-06602
Needle bearing attachment:
YB-6082/90890-06615



18. Reverse gear bearing and forward gear bearing.
    Separate the bearing from the gear.
    Using special service tool and hydraulilc press.

Bearing separator:
YB-6219/90890-06534



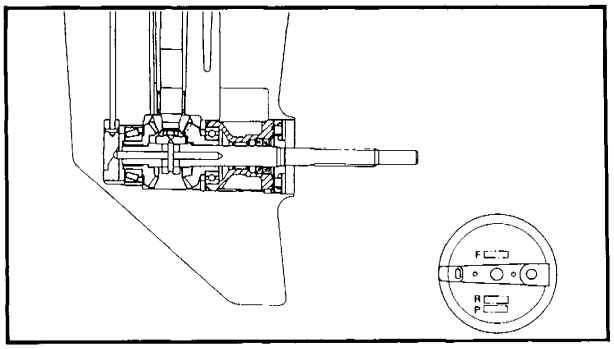
Note the following points:

1. For ease of reassembly and adjustment, keep shim packs in their groups as removed.

2. To remove an oil-seal and bearing, following the instructions in the illustrations.

5) If the feeler gauge(s) will not fit, then add additional shims until the feeler gauge(s) (set at the **M** specification) just fit between the tool and the gear.
6) If the feeler gauge(s) are a loose fit, then remove shims until the feeler gauge(s) (set at the **M** specification) just fit between the tool and the gear.

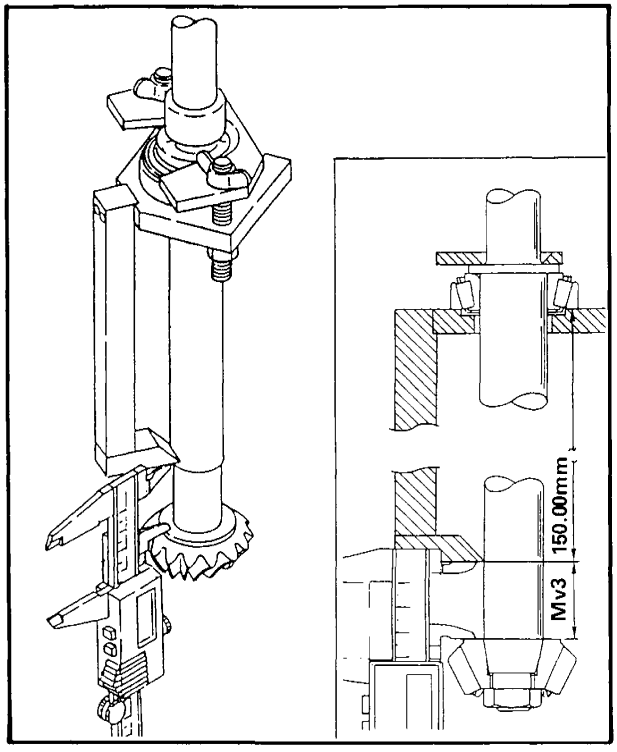
Available shim thicknesses:
0.05, 0.08, 0.12, 0.30, and 0.50 mm



SHIM SELECTION
(Except for USA and CANADA)

NOTE:

1. When reassembling the lower unit with the original gear case and inner parts, shim selection is not required.
2. When replacing the gear case only, read the numeral preceded by "F,R,P", and adjust the shims according to the difference between numerals of the original gear-case and the new gear-case.
3. If the bearing(s) and/or gear(s) are replaced, carry out the shim selection.



Pinion gear shim

1) Assembly the pinion height gauge with the drive shaft and bearing as shown in the illustration.

Pinion height gauge:
90890-06702

NOTE:

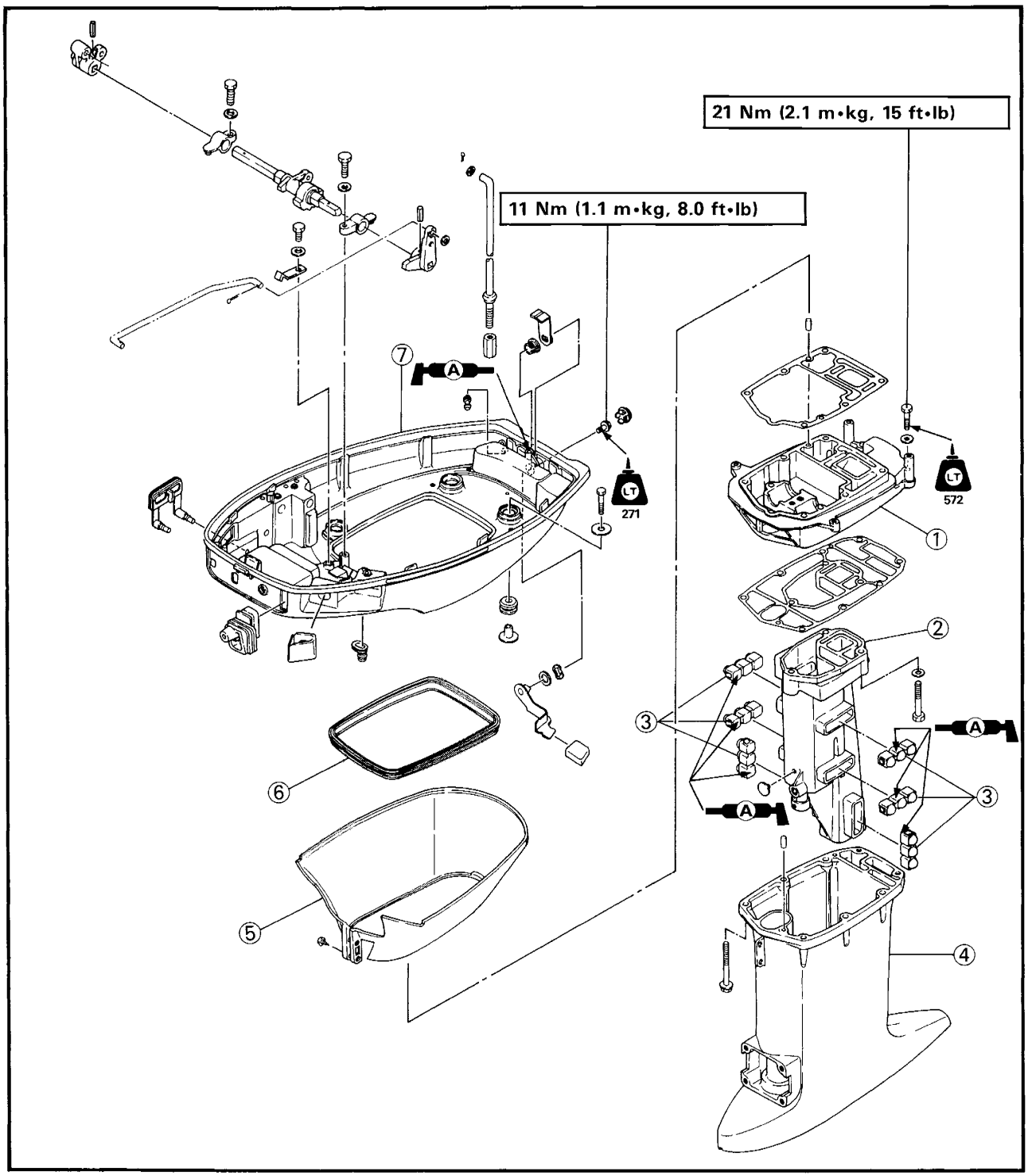
Add a 1/4 turn to each of the butterfly nut after it touches fixing plate.

2) Install the pinion on the drive shaft, and tighten the nut to the specified torque.

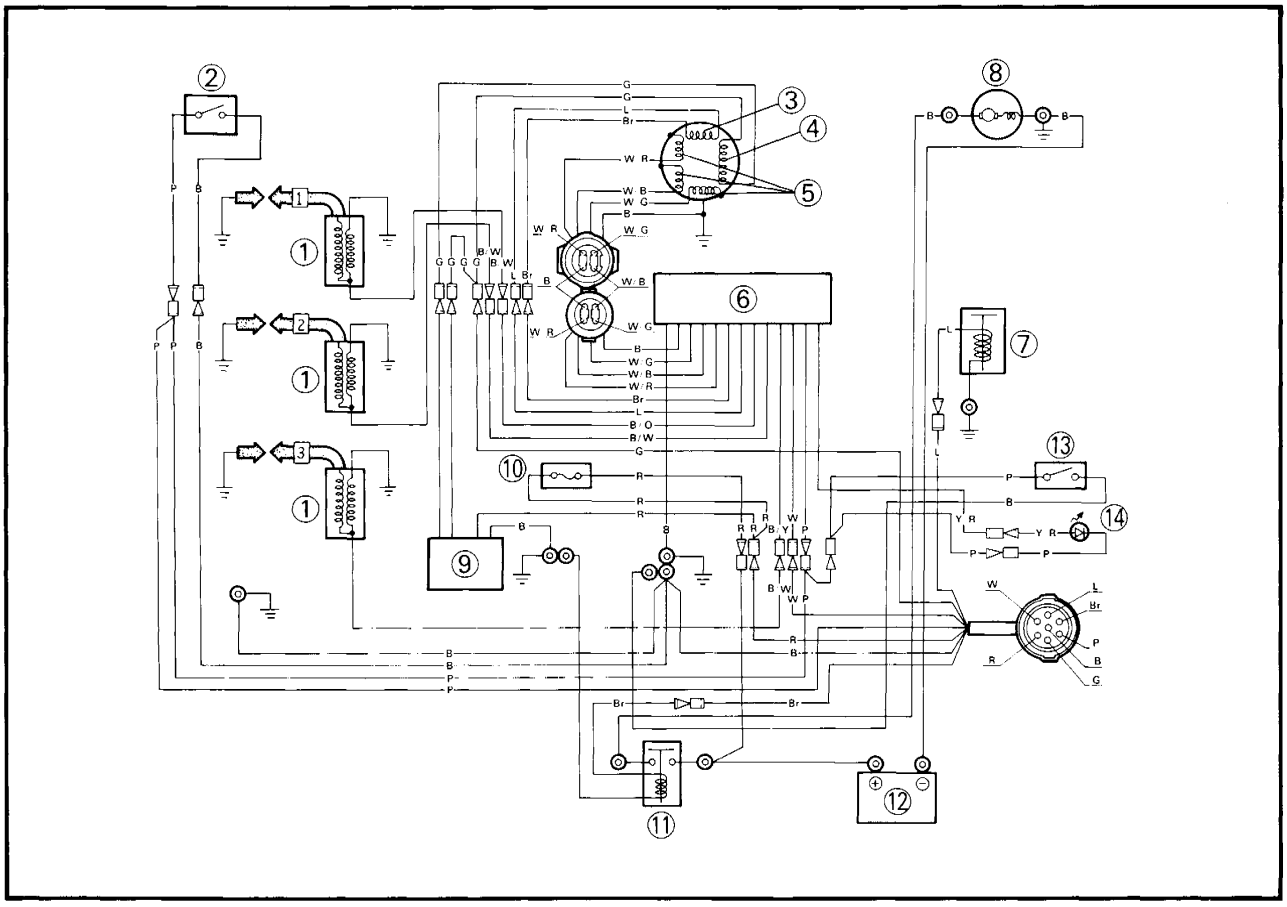
Pinion nut:
51 Nm (5.1 m•kg, 37 ft•lb)

UPPER CASING

① Exhaust guide
② Exhaust manifold
③ Damper
④ Upper case
⑤ Apron
⑥ Seal
⑦ Bottom cowling

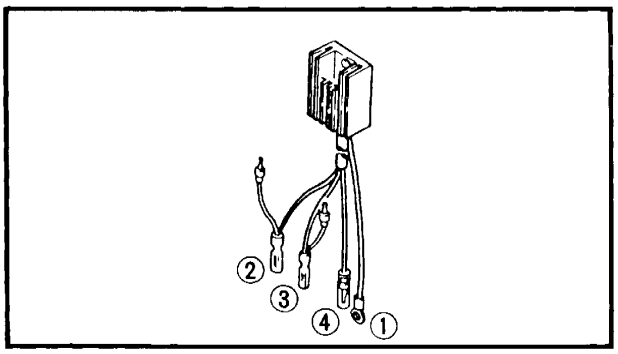


25JEO, 30ER/30DEO



① Ignition coil
② Thermo switch
③ Charge coil
④ Lighting coil
⑤ Pulser coil
⑥ C.D.I. unit
⑦ Fuel enrichment valve
⑧ Starter motor
⑨ Rectifier
⑩ Fuse (10A)
⑪ Starter relay
⑫ Battery
⑬ Oil level sensor
⑭ Oil level warning lamp (L.E.D.)

B : Black
Br : Brown
G : Green
L : Blue
O : Orange
P : Pink
R : Red
W : White
Y : Yellow



M56500-0

RECTIFIER REGULATOR

25MH/25JM, 25JMO, 30MH/30DMO, 30DRO

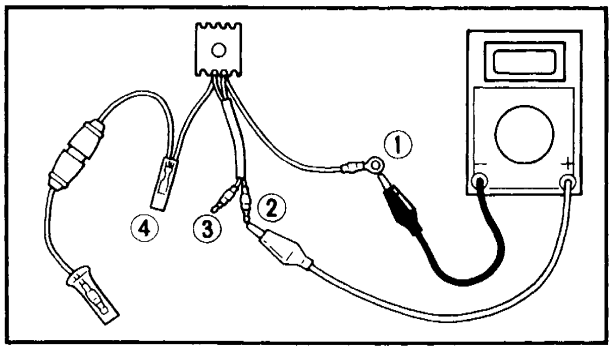
1) Check the continuity of the rectifier regulator.

Rectifier regulator check

Tester ⊕ / Tester ⊖	① Black	② Green	③ Green/white	④ Red
① Black		∞	∞	∞
② Green	○		∞	∞
③ Green/White	○	∞		∞
④ Red	○	○	○	

○ : Continuity
∞ : Discontinuity

If continuity is not as specified, replace the rectifier regulator.



M56500-0

RECTIFIER

25JEO, 30EH/30DEMO, 30DE, 30ER/30DEO

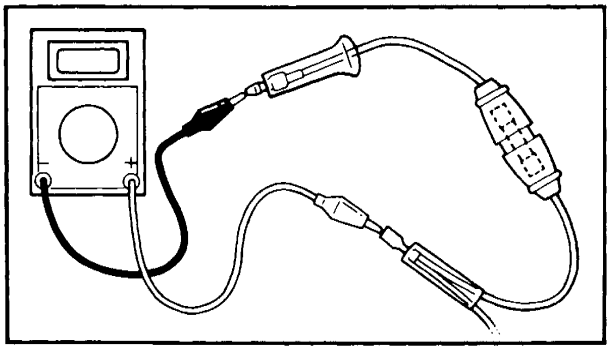
1) Check the continuity of the rectifier.

Rectifier check

Tester ⊕ / Tester ⊖	① Black	② Green	③ Green	④ Red
① Black		∞	∞	∞
② Green	○		∞	∞
③ Green	○	∞		∞
④ Red	○	○	∞	

○ : Continuity
∞ : Discontinuity

If continuity is not as specified, replace the rectifier.



M57002-0

FUSE

25JEO, 30EH/30DEMO, 30DE, 30ER/30DEO

1) Referring to the diagram, check the continuity of the fuse. If the fuse is blown, replace with a fuse of correct rating.

Fuse rating: 10A

CHAPTER 9
TROUBLE-ANALYSIS

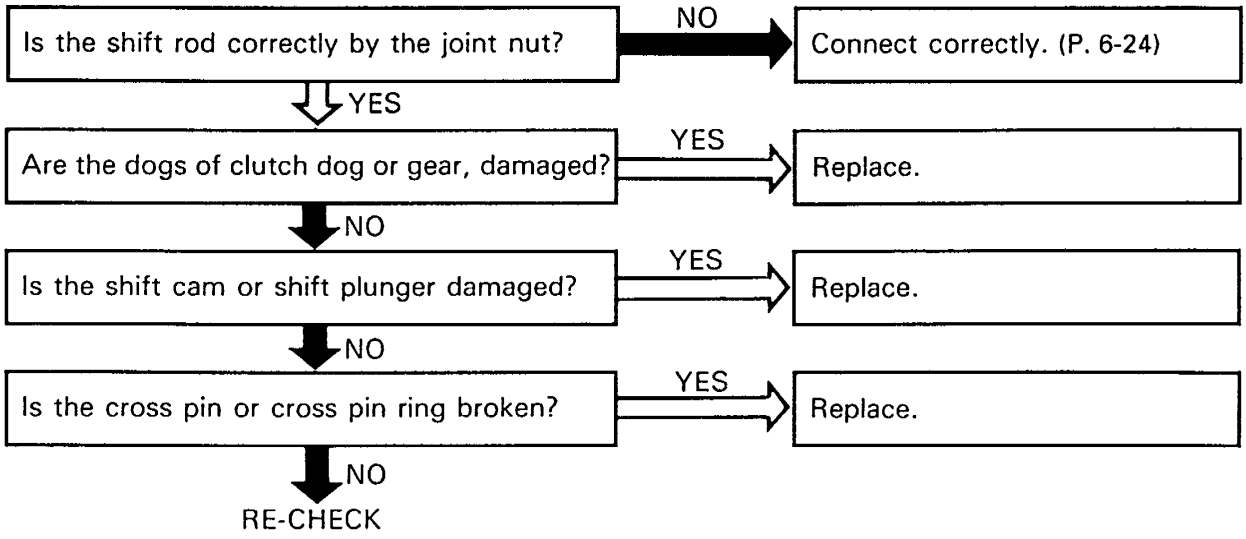
GEAR SHIFTING IS IMPOSSIBLE OR HARD

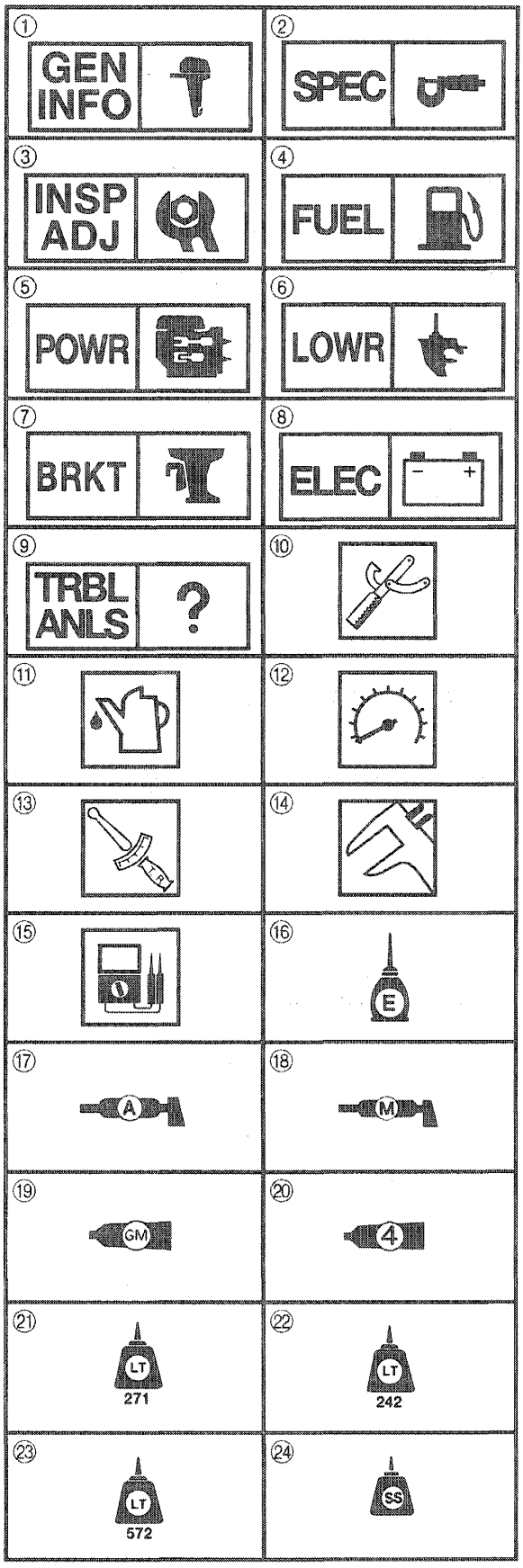
⚠WARNING

STOP THE ENGINE.
Do not start the engine during following inspections. Remove the Battery terminals.

Move shift handle to "Neutral", "Forward" and "Reverse".
Turn propeller and check that gears are in "Neutral", "Forward" and "Reverse".

(1) MANUAL HANDLE MODEL





SYMBOLS

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

① General information
② Specifications
③ Periodic Inspection and Adjustment
④ Fuel system
⑤ Power unit
⑥ Lower unit
⑦ Bracket unit
⑧ Electrical system
⑨ Trouble analysis

Symbols ⑩ to ⑮ indicate specific data:

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

Symbol ⑯ to ⑱ in an exploded diagram indicate grade of luburicant and location of lubrication point:

⑯ Apply Yamaha 2-stroke outboard motor oil
⑰ Apply water resistant grease
(Yamaha grease A, Yamaha marine grease)
⑱ Apply molybdenum disulfide grease

Symbols ⑲ to ㉔ in an exploded diagram indicate grade of sealing or locking agent, and location of application point:

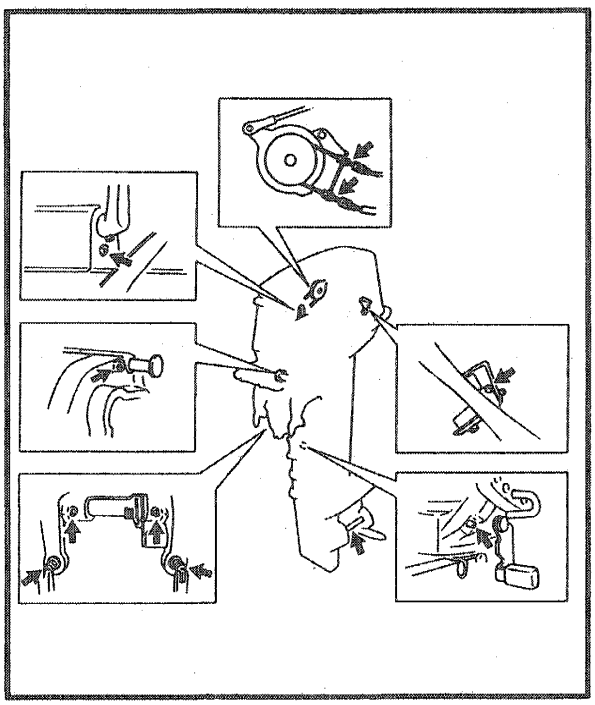
⑲ Apply Gasket Maker®
⑳ Apply Yamabond #4 (Yamaha bond No. 4)
㉑ Apply LOCTITE® No. 271 (Red LOCTITE)
㉒ Apply LOCTITE® No. 242 (Blue LOCTITE)
㉓ Apply LOCTITE® No. 572
㉔ Apply Silicon sealant

NOTE:

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

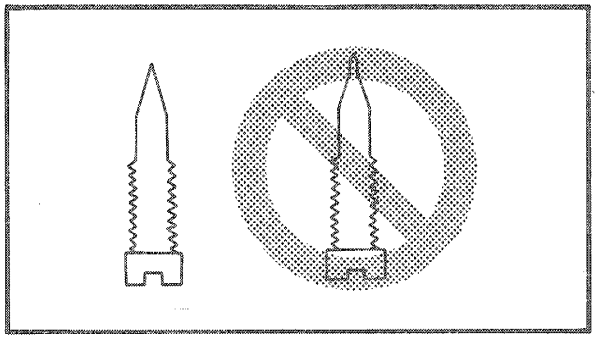
CHAPTER 2
SPECIFICATIONS

CHAPTER 3
PERIODIC INSPECTION AND ADJUSTMENT



Greasing points

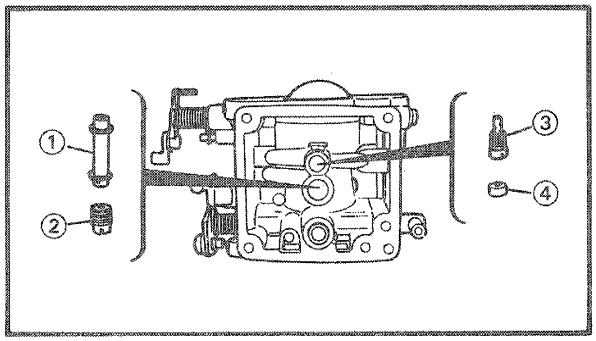
1. Apply:
   - Water resistant grease



E32052-0

Pilot screw

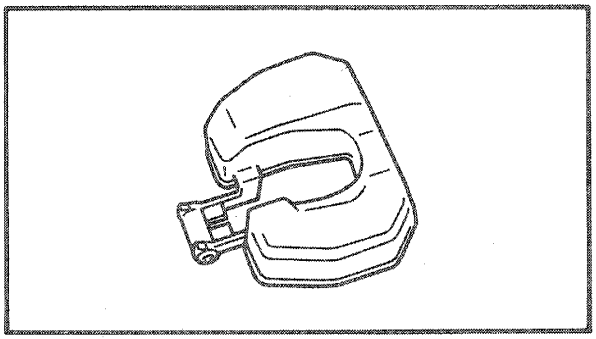
1. Inspect:
   - Pilot screw
     Bend/Wear → Replace.



E32054-0

Jet and nozzle

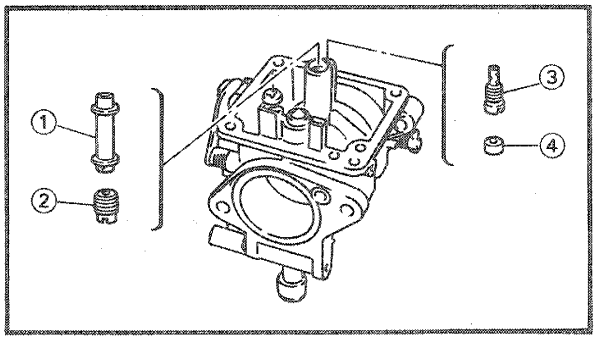
1. Inspect:
   - Main nozzle ①
   - Main jet ②
   - Pilot jet ③
   - Plug ④
     Clog/Damage → Replace.



E32058-0

Float

1. Inspect:
   - Float
     Crack/Damage → Replace.



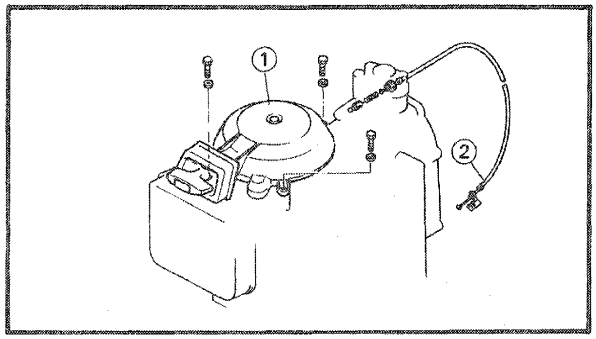
E34050-0

ASSEMBLY AND INSTALLATION

CAUTION:

Always use new gaskets as a preventive measure against fuel leakage.

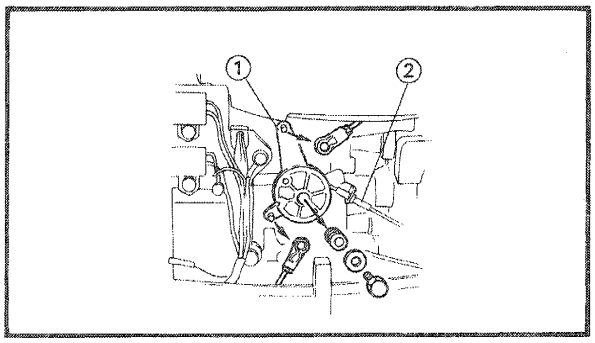
1. Install:
   - Main nozzle ①
   - Main jet ②
   - Pilot jet ③
   - Plug ④



Manual starter assembly

1. Install:
   - Manual starter assembly ①
   - Start-in-gear protection wire ②

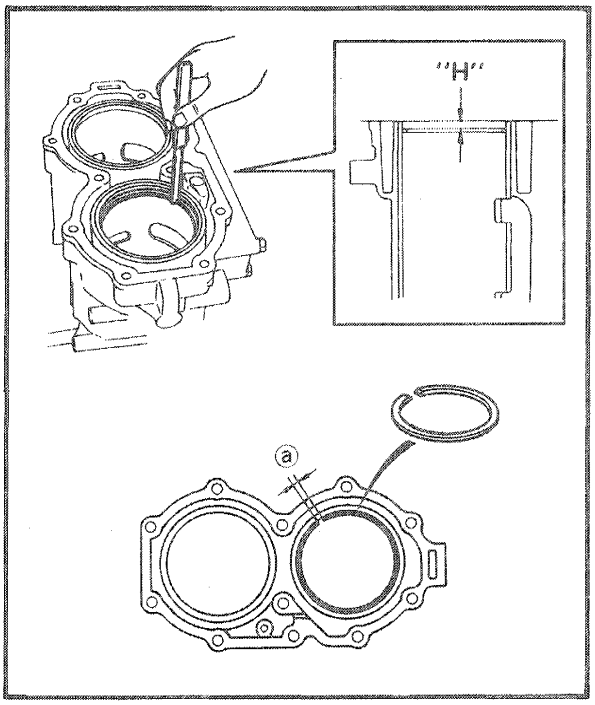
   Refer to the "CONTROL SYSTEM" section in CHAPTER 3.



Magneto control lever

1. Install:
   - Magneto control lever ①
   - Throttle cable ② (manual handle)

   Refer to the "CONTROL SYSTEM" section in CHAPTER 3.

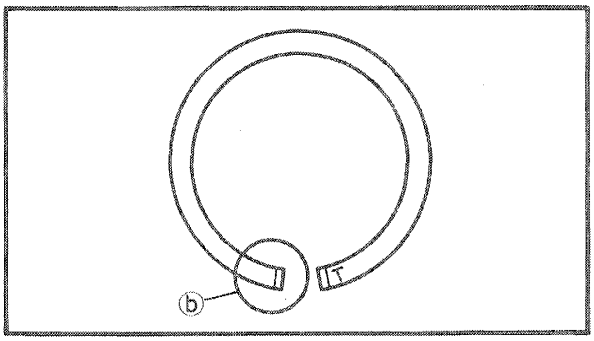


2. Measure:
   •Piston ring end gap
   Using a feeler gauge.
   Out of specification → Replace.

	Ring end gap ⓐ :	Measuring point "H"
Top	0.20 ~ 0.35 mm (0.008 ~ 0.014 in)	15 mm (0.59 in)
2nd	0.20 ~ 0.35 mm (0.008 ~ 0.014 in)	

NOTE:

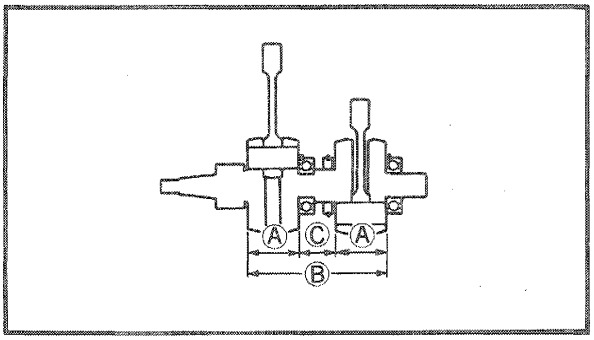
- Install the piston ring into the cylinder. Push the ring with the piston crown.
- "H" 15 mm (0.59 in) from the cylinder top.



PISTON RING OVER SIZE

•Top and 2nd ring
Over size top ring and 2nd ring sizes are stamped on top of ring.

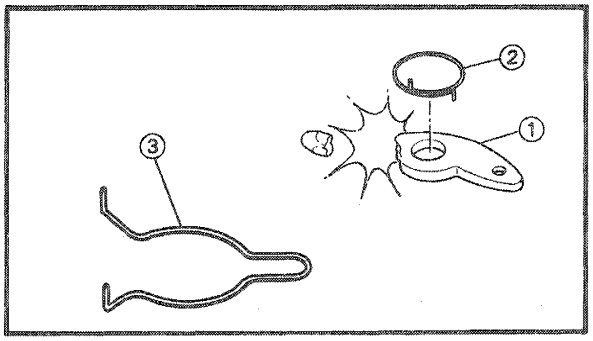
Size		Stamped mark ⓑ
Over size 1	0.25 mm (0.0098 in)	25
Over size 2	0.50 mm (0.0197 in)	50



CRANKSHAFT

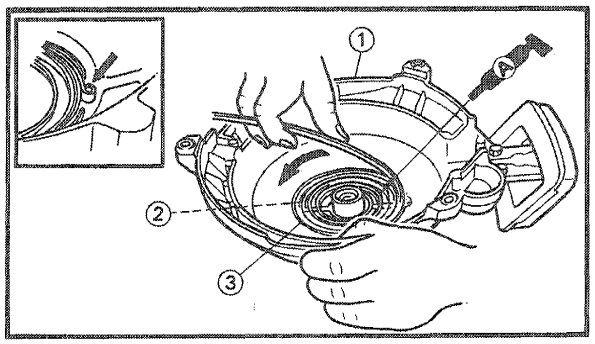
1. Measure:
   •Crank wide
   Out of specification → Replace.

Crank width Ⓐ :
56.90 ~ 56.95 mm
(2.240 ~ 2.242 in)
Crank width Ⓑ :
153.7 ~ 154.0 mm
(6.051 ~ 6.063 in)
Crank width Ⓒ :
39.9 ~ 40.1 mm
(1.571 ~ 1.579 in)



Drive pawl and spring

1. Inspect:
   - •Drive pawl ①
     Broken/Damage → Replace.
   - •Return spring ②
   - •Friction spring ③
     Broken/Bent/Damage → Replace.



ASSEMBLY AND INSTALLATION

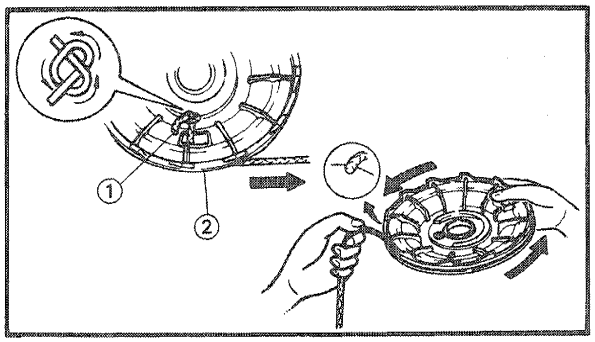
1. Install:
   - •Starter case ①
   - •Thrust washer ②
   - •Spiral spring ③

NOTE:

- •When installing the new spiral spring, do not cut the wire holding the spring.
  After installing, cut the wire.
- •When reusing the spiral spring, set the leading end first in the housing and then fit one turn each time. Use special care.
  The spring can easily come off.

⚠ WARNING

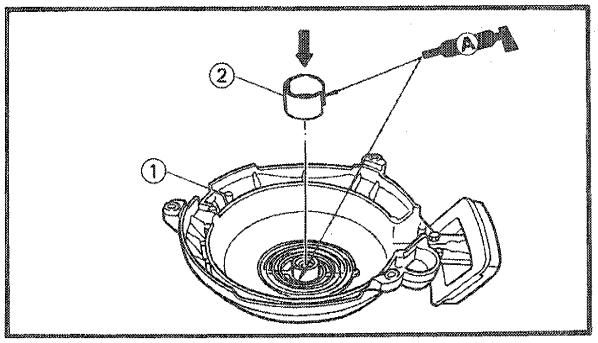
The spiral spring may jump out so use special care.



2. Install:
   - •Starter rope ①
   - •Sheave drum ②

NOTE:

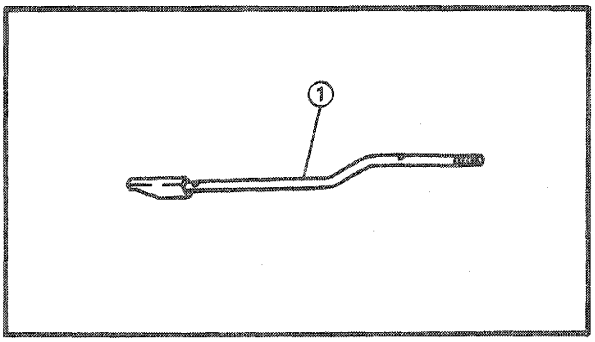
- •Make a knot on one end.
- •Pass the rope through the hole in the sheave drum and wind it 1-1/2 turns around the drum.



3. Install:
   - •Starter case ①
   - •Bushing ②

NOTE:

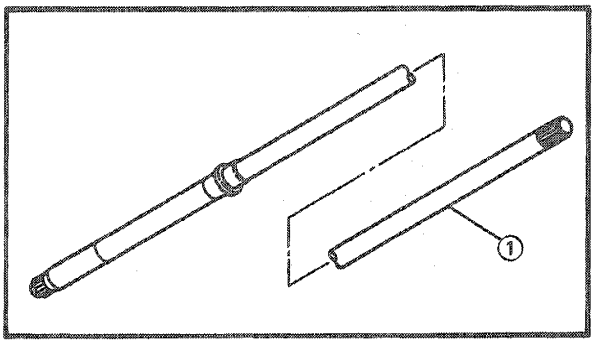
Mount the bushing on the starter case shaft.



SHIFT CAM

1. Inspect:
   - Shift cam ①

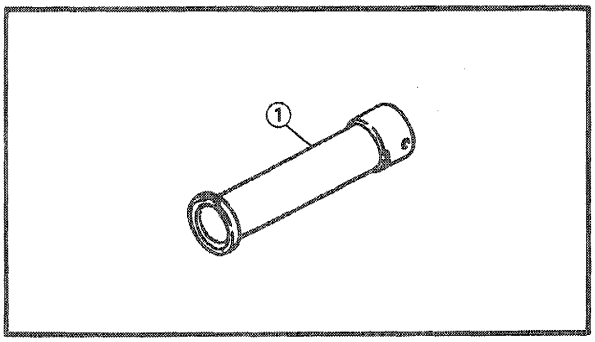
   Wear/Damage → Replace.



DRIVE SHAFT

1. Inspect:
   - Drive shaft ①

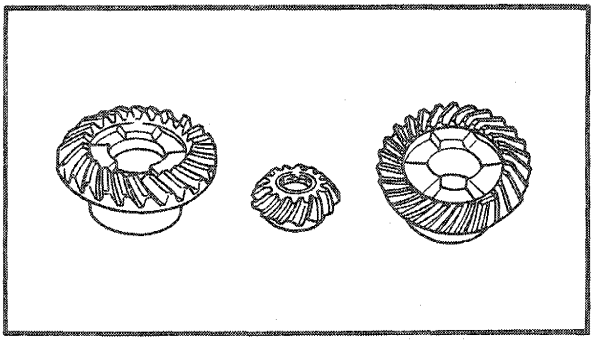
   Wear/Damage → Replace.



SLEEVE

1. Inspect:
   - Sleeve ①

   Wear/Damage → Replace.



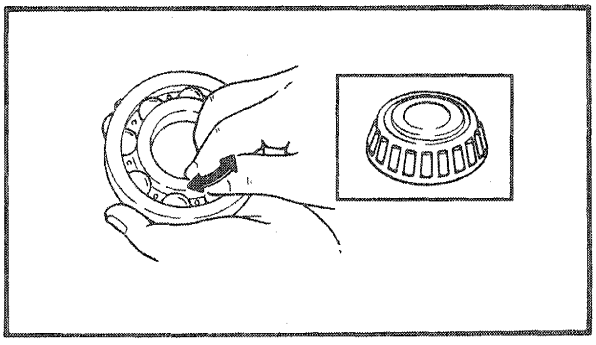
GEARS

1. Inspect:
   - Teeth
   - Dogs

   Wear/Damage → Replace.

NOTE:

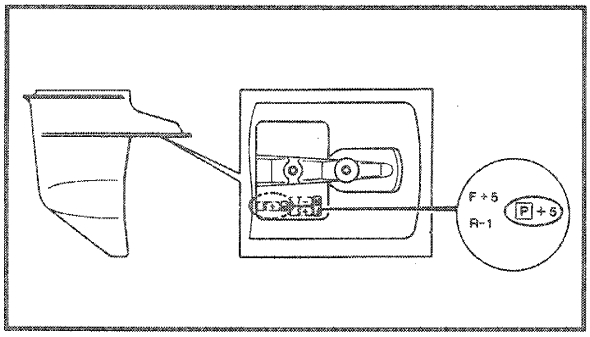
If any one of the gear is damaged, all gears should be replaced as a set.

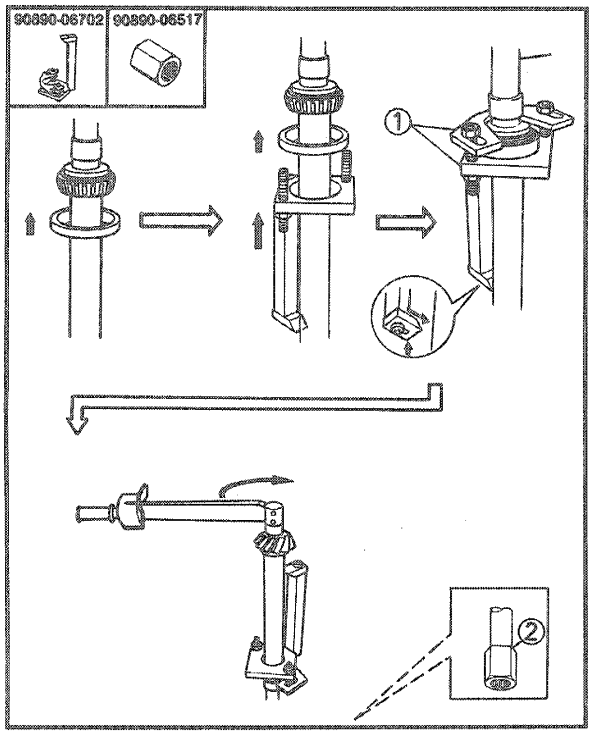


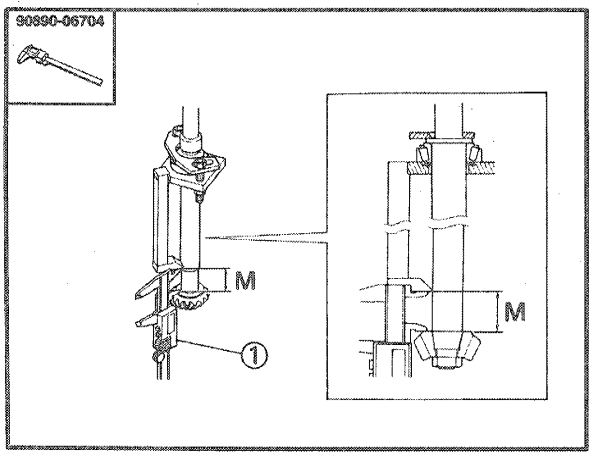
BEARING

1. Inspect:
   - Bearing

   Pitting/Rumbling → Replace.







- ℙ is the deviation of the lower case dimension from standard. It is stamped on the anode mounting surface of the lower case in 0.01 mm units. If the ℙ mark is missing or unreadable, assume an ℙ mark of "0", and check the backlash when the unit is assembled.

- Install the taper roller bearing and outer race on the drive shaft.
- Set the pinion height gauge on the shaft.
- Install in the pinion onto the drive shaft and tighten to specification.
  Refer to the "ASSEMBLY" section.

Pinion hight gauge ①:
- , 90890-06702
Drive shaft holder ②:
- , 90890-06517

NUT:
50 Nm (5.0 m • kg 36 ft • lb)

NOTE:

- Shim adjustment is impossible without tightening the pinion to specification.
- When tightening the pinion, avoid gripping the drive shaft in a vise.
  Install the drive shaft holder tool onto the drive shaft, and grip the drive shaft holder tool in a vise.

- Using digital caliper at the specified measurement (M) established above, check the fit between the pinion as shown.

Digital caliper ①:
- , 90890-06704

NOTE:

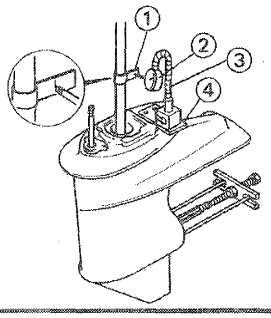
- Take a note of the measurement (M).
- When using the digital caliper, be sure to place it at right angles to the pinion.
  Otherwise, measurement will be incorrect.

YB-6265
90890-06706

YU-3097
90890-01252

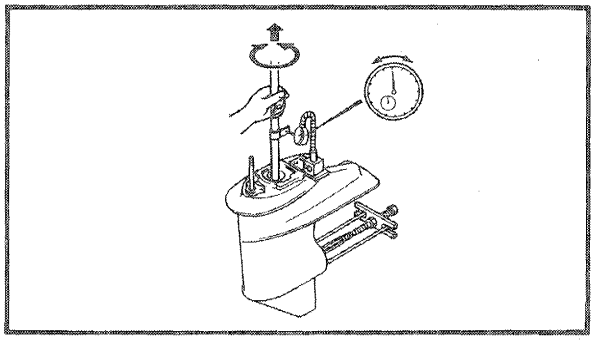
YU-034481
90890-06705

YB-7003



- Attach the backlash adjustment gauge ① on the drive shaft.
- Attach the dial gauge ② on the dial gauge stand ③ and install it on the lower case, and make the dial gauge stem contact the mark on the adjustment gauge.

Backlash adjustment gauge ①:
YB-6265, 90890-06706
Dial gauge ②:
YU-3097, 90890-01252
Dial gauge stand ③:
YU-34481, 90890-06705
Backlash plate ④:
YB-7003, -



- 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.

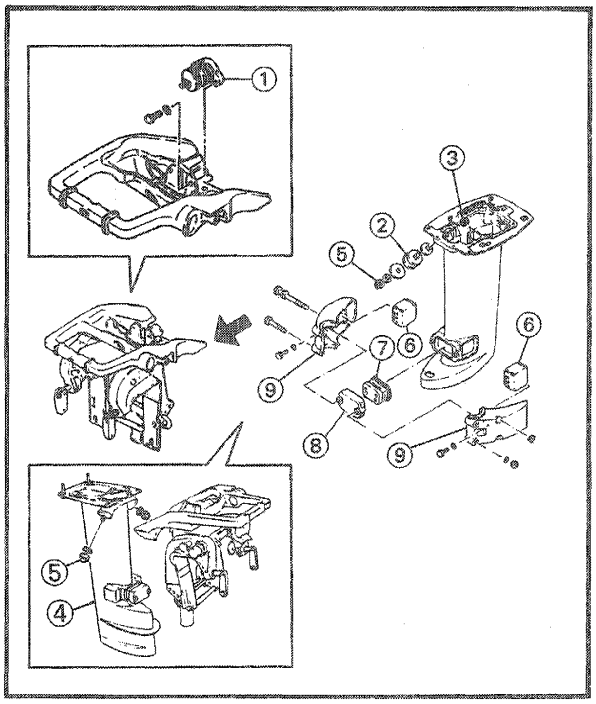
Less than 0.31 mm	To be decreased by *0.52 – measurement
More than 0.72 mm	To be increased by measurement – *0.52

*Backlash mid point

Available shim thickness:
1.0, 1.1, 1.2, 1.3, 1.4 mm

NOTE:

If the measurement is between 0.31 and 0.72 mm do not change the shim.

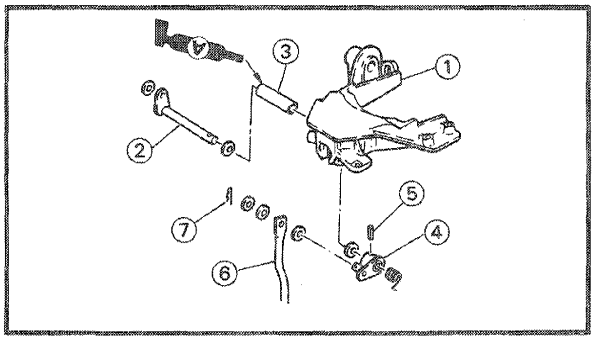


ASSEMBLY

Upper casing

1. Install:
   - Mount rubber ① (front upper)
   - Mount rubber ② (side upper)
   - Nut ③
   - Upper casing ④ (to swivel bracket)
   - Nut ⑤
   - Mount rubber ⑥ (side lower)
   - Mount rubber ⑦ (front lower)
   - Lower mount cover ⑧
   - Lower mount rubber housing ⑨

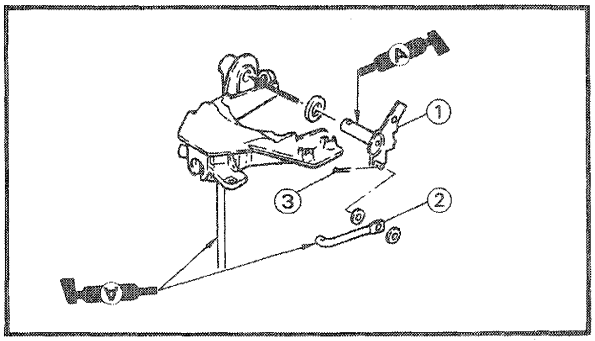
Nut ⑤:
17 Nm (1.7 m·kg, 12 ft·lb)
Nut (lower mount rubber housing):
17 Nm (1.7 m·kg, 12 ft·lb)



2. Install:
   - Bracket ①
   - Shift rod lever ②
   - Collar ③
   - Shift rod lever 2 ④
   - Spring pin ⑤
   - Shift rod ⑥
   - Cotter pin ⑦

NOTE:

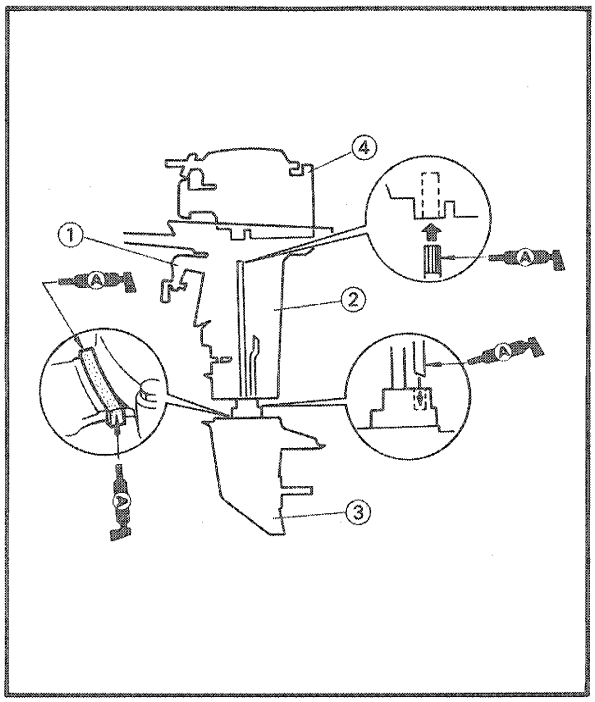
- Always use the new spring pin and the cotter pin.
- Apply water resistant grease to the collar inner surface and grease nipple.



3. Install:
   - Cam plate ①
   - Link rod ②
   - Cotter pin ③

NOTE:

- Always use the new cotter pin.
- Apply water resistant grease to the cam plate shaft and the shift rod.



INSTALLATION

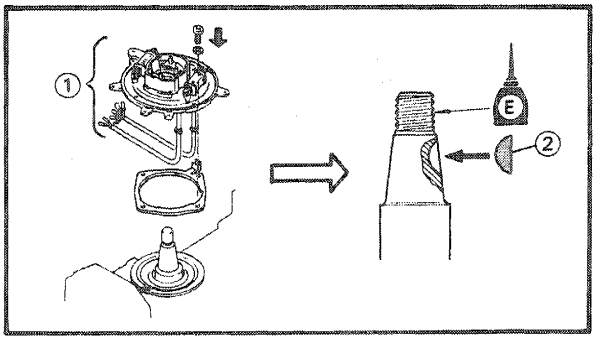
Bracket unit

1. Install:
   - Bracket unit ①
   - Upper casing and bottom cowling ②
     Refer to the "UPPER CASING AND BOTTOM COWLING" section.
   - Lower unit ③
     Refer to the "INSTALLATION" section in CHAPTER 6.
   - Power unit ④
     Refer to the "POWER UNIT REMOVAL AND INSTALLATION" section in CHAPTER 5.

NOTE:

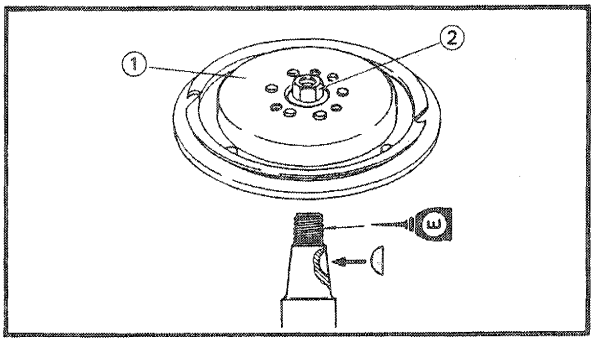
Apply water resistant grease to the matching surfaces as shown.

REMOVAL AND INSTALLATION



Installation

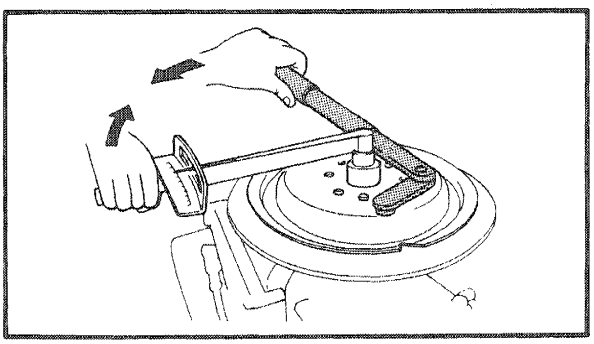
1. Install:
   - Base assembly ①
   - Woodruff key ②



2. Install:
   - Magneto rotor ①
   - Nut ②

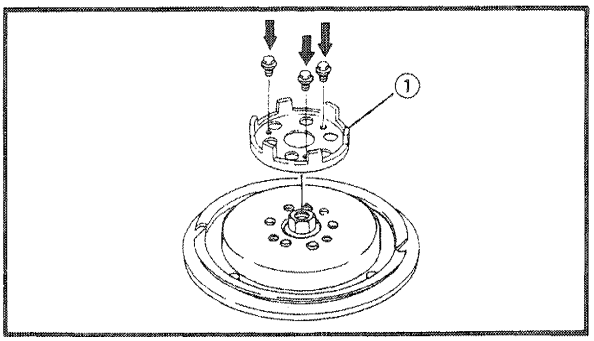
NOTE:

When installing the magneto rotor, make sure the key is properly seated in the key way of the crankshaft, and install the magneto rotor to the crankshaft.

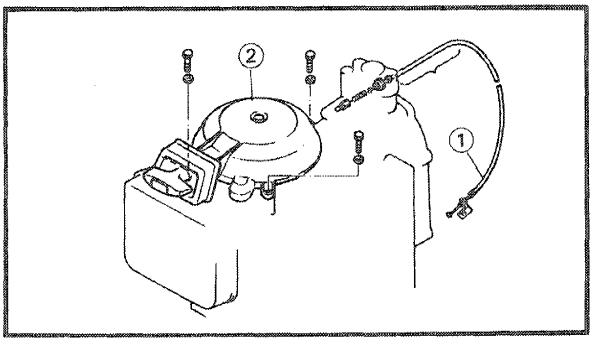


	Flywheel magneto holder: YB-6139, 90890-06522

	Nut (magneto rotor): 140 Nm (14 kg•m, 100 ft•lb)



3. Install:
   - Starter pulley ①



4. Connect:
   - Start-in-gear protection wire ①

   Refer to the "CONTROL SYSTEM" section in CHAPTER 3.

5. Install:
   - Manual starter assembly ②

ELECTRIC STARTING SYSTEM [ELECTRIC STARTER MODEL]

FUSE

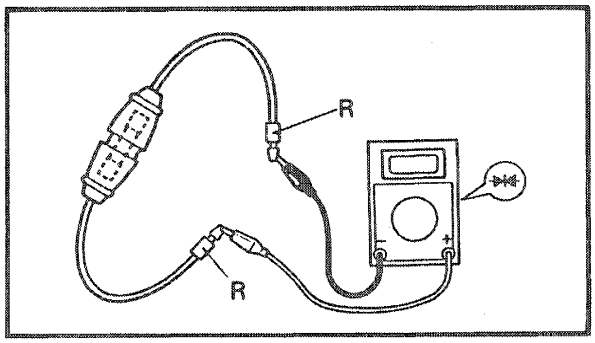
CAUTION:

Don't forget to turn off the main switch when checking or replacing the fuse. Otherwise, it may cause accidental shortcircuiting.

⚠ WARNING

Do not use fuses of a higher amperage rating than those recommended. Substitution of a fuse of improper rating can cause extensive electrical system damage and possible fire.

Fuse rating:
20 A

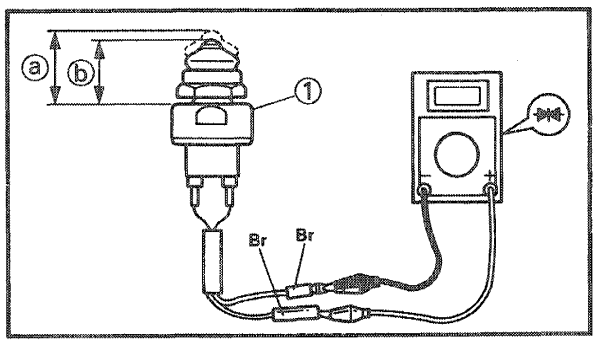


1. Check:
   - Fuse ①
   Blown → Replace.

M58950-0*

BATTERY

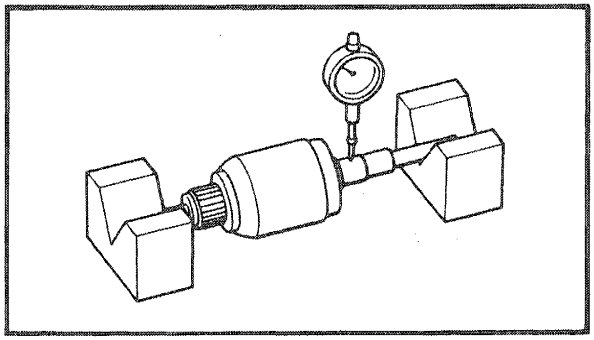
Refer to the "GENERAL" section in CHAPTER 3.



M57750-0

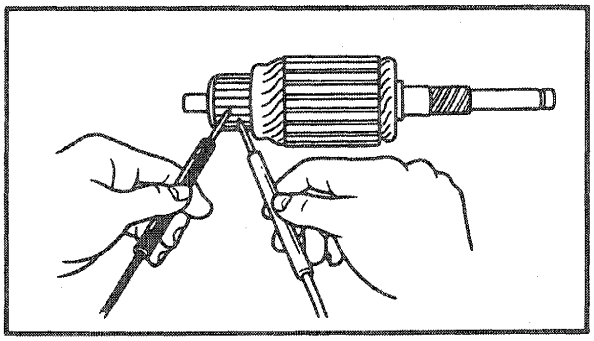
NEUTRAL SWITCH

1. Check:
   - Continuity of neutral switch ①
   Out of specification → Replace.



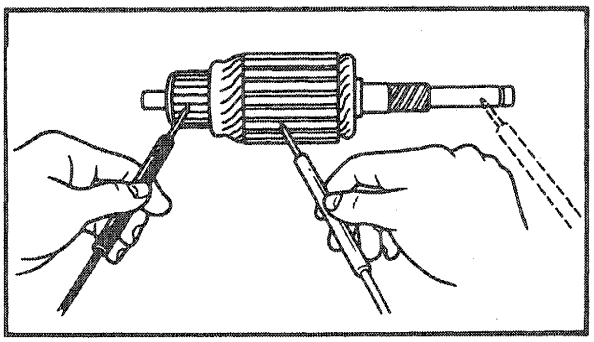
4. Measure:
   •Commutator deflection
   Use a dial-gauge and block.
   Out of specification → Replace.

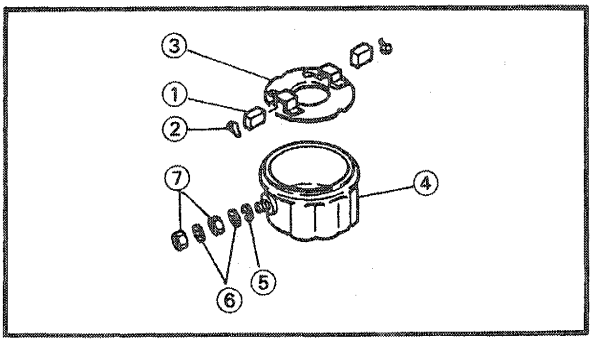
	Deflection limit: 0.05 mm (0.002 in)



5. Check:
   •Armature coil continuity
   Out of specification → Replace.

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





ASSEMBLY

1. Install:
   •Brush ①
   •Brush spring ②
   •Brush holder ③
   •Rear cover ④
   •Washer (Plain) ⑤
   •Washer (Spring) ⑥
   •Nut ⑦

	Nut: 4 Nm (0.4 m·kg, 2.9 ft·lb)

HOW TO USE THIS MANUAL

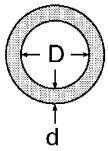
① The main points regarding removing/installing and disassembling/assembling procedures are shown in the exploded views.

② The numbers in the exploded views indicate the required sequence of the procedure and should be observed accordingly.

③ Symbols are used in the exploded views to indicate important aspects of the procedure. A list of meanings for these symbols is provided on the following page.

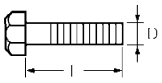
④ It is important to refer to the job instruction charts at the same time as the exploded views. These charts list the sequence that the procedures should be carried out in, as well as providing explanations on part names, quantities, dimensions and important points relating to each relevant task.

Example:
O-ring size 39.5 × 2.5 mm: inside diameter (D) × ring diameter (d)

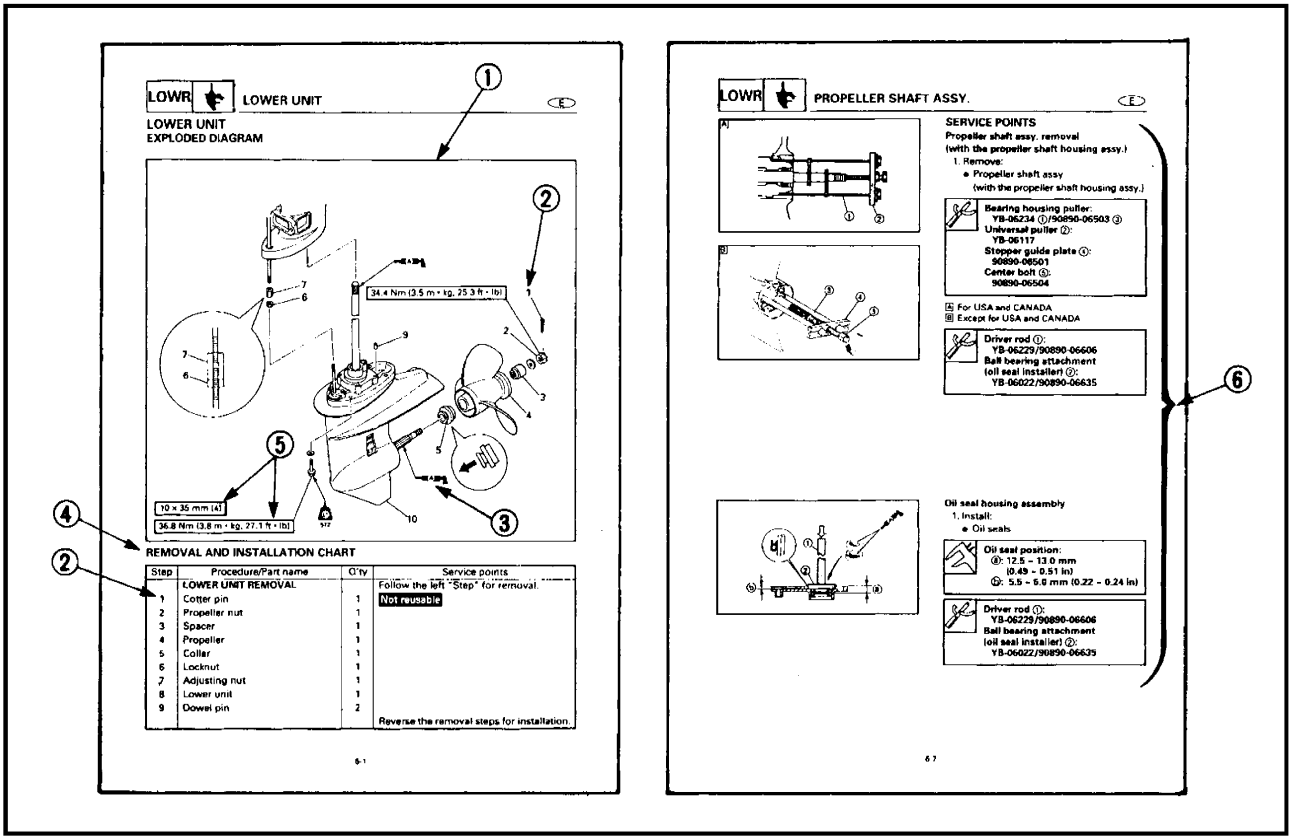


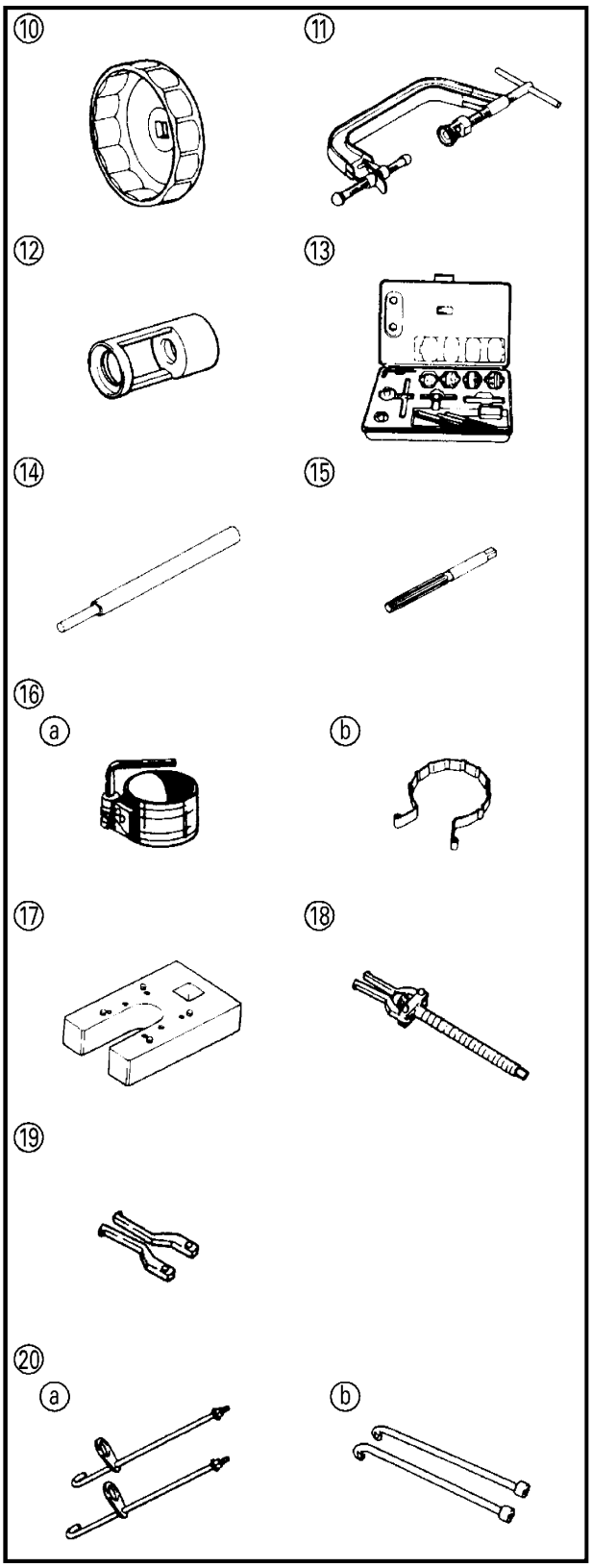
⑤ In addition to tightening torques, the dimensions of the bolts and screws are also mentioned.

Example:
Bolt and screw size 10 × 25 mm : bolt and screw diameter (D) × lenght (L)



⑥ In addition to the exploded views and job instruction charts, this manual provides individual illustrations when further explanations are required to explain the relevant procedure.





⑩ Oil filter wrench
P/N. YU-38411
90890-01426

⑪ Valve spring compressor
P/N. YM-01253
90890-04019

⑫ Adapter
P/N. YB-06554
90890-06554

⑬ Valve seat cutter set
P/N. YM-91043-C
90890-06803

⑭ Valve guide remover
P/N. YM-01122
90890-04016

⑮ Valve guide reamer
P/N. YM-01196
90890-04016

⑯ Piston slider
P/N. YU-33294 ..... ⓐ
90890-06529 ..... ⓑ

⑰ Tilt cylinder wrench
P/N. YB-06175-2B
90890-06544

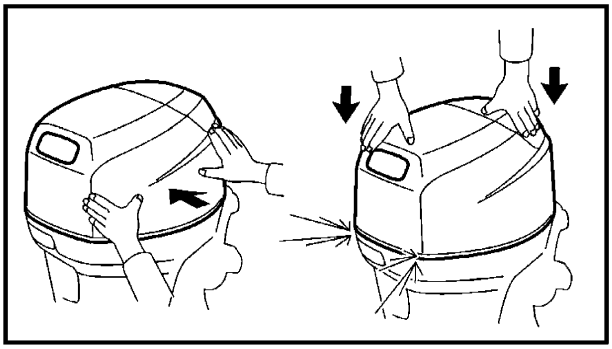
⑱ Bearing puller
P/N. 90890-06535

⑲ Small universal claws
P/N. 90890-06536

⑳ Propeller shaft housing puller
P/N. YB-06234 ..... ⓐ
90890-06503 ..... ⓑ

Item	Worldwide / USA, Canada	Unit	Model	
			F40BMHD, WHD	F40BED, F40BET
			F40MH	F40ER, F40TR
IGNITION CONTROL SYSTEM				
Oil pressure switch		kPa (kgf/cm^2, psi)	15.5 (1.55, 2.25)	
Power coil (Y/B-Y/B)				
Loaded				
@ cranking 1*		V	7	
@ 1,500 r/min		V	25	
@ 3,500 r/min		V	67	
Open circuit				
@ cranking 2*		V	15	
@ 1,500 r/min		V	25	
@ 3,500 r/min		V	67	
Power coil resistance (Y/B-Y/B)		Ω	6.5 - 7.2	
Engine temperature sensor resistance				
@ 5 °C (41 °F)		kΩ	25	
@ 20 °C (68 °F)		kΩ	12	
@ 70 °C (158 °F)		kΩ	2	
Engine speed limiter				
Retard timing		r/min	6,200	
Reset		r/min	6,000	
Overheat speed control		r/min	2,000	
STARTING SYSTEM				
Fuse		A	20	
STARTER MOTOR				
Type			Bendix	
Rating		Second	30	
Output		kW	1.2	
Brush length limit		mm (in)	6.4 (0.25)	
Commutator undercut		mm (in)	0.8 (0.03)	

* Cranking 1: Open circuit
Cranking 2: Related parts are connected.

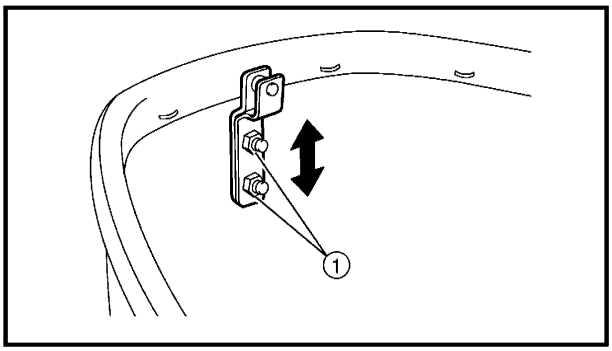


TOP COWLING

CHECKING THE TOP COWLING FIT

1. Check:
   - Top cowling fitting

     Loose/unlatched → Adjust the top cowling hook.



2. Adjust:
   - Top cowling hook position

Adjustment steps

(1) Loosen the nuts ① approximately 1/4 of a turn.

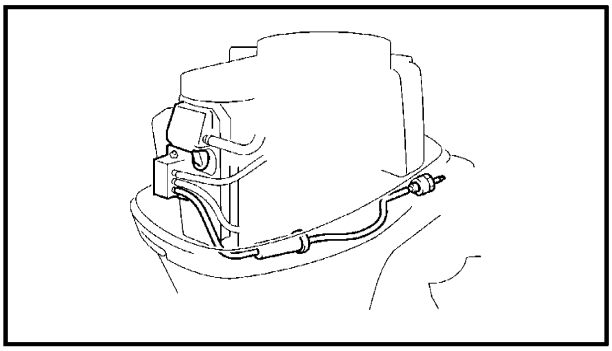
(2) Move the top cowling hook either up or down slightly.

(3) Secure the bolts.

(4) Check the top cowling fitting and repeat the adjustment if necessary.

NOTE:

- Moving the latch towards the seal will loosen the top cowling.
- Moving the latch away from the seal will tighten the top cowling.



FUEL SYSTEM

CHECKING THE FUEL LINE

Check:

- Fuel line

  Cracks/damage/leaks → Replace.
  Refer to "FUEL JOINT, FUEL FILTER, AND FUEL PUMP" on page 4-2.

4. Install:
   - Cylinder head cover
   - Spark plugs
   - Flywheel magnet assembly cover
5. Connect:
   - Blowby hose
   - Fuel hoses
   - Spark plug leads

MEASURING THE COMPRESSION PRESSURE

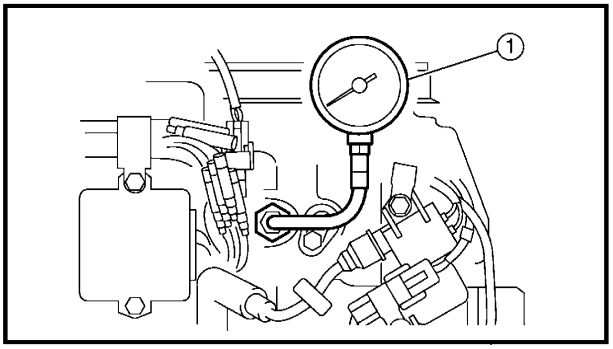
CAUTION:

Before removing a spark plug, use compressed air to blow away dirt accumulated in the spark plug well to prevent it from falling into the cylinder that is being tested.

1. Check:
   - Valve clearance

     Out of specification → Adjust.
     Refer to "ADJUSTING THE VALVE CLEARANCE" on page 3-11.
2. Warm-up:
   - Engine
3. Remove:
   - Spark plug(-s)
4. Install:
   - Compression gauge ①

     (into the spark plug hole)



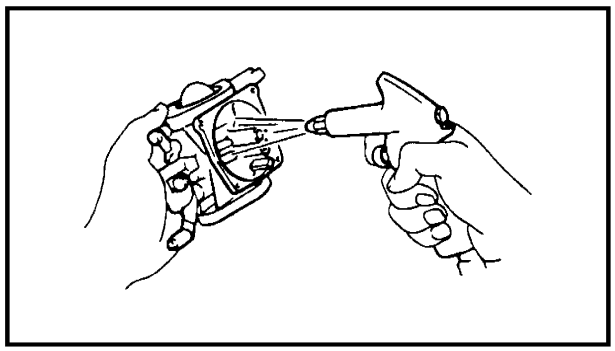
	Compression gauge **YU-33223 / 90890-03160**

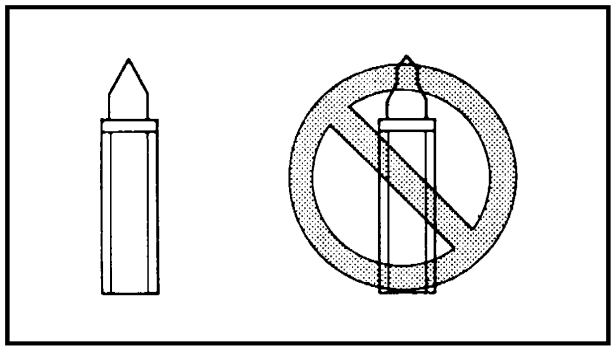
5. Measure:
   - Compression pressure

     Below minimum compression pressure → Inspect valve clearance, valve face, valve seat, piston rings, cylinder sleeve, piston, cylinder head gasket and cylinder head.

	Compression pressure **Minimum** **1,210 kPa (12.1 kgf/cm^2, 175 psi)**

CHAPTER 4
FUEL SYSTEM



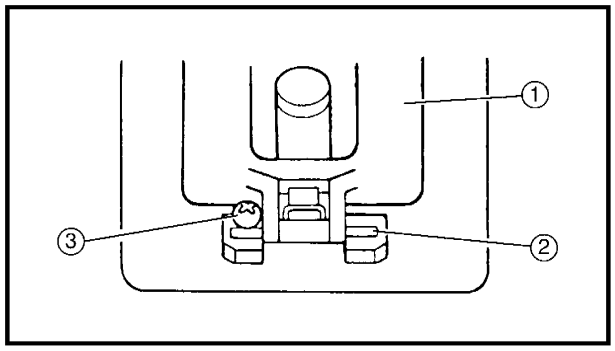


CHECKING THE CARBURETOR

NOTE:
Before disassembling the carburetor, make sure to note the number of times the pilot screw is turned out from the seated position to its set position.

CAUTION:
Do not use a steel wire to clean the jets. This may enlarge the jet diameters and seriously affect performance.

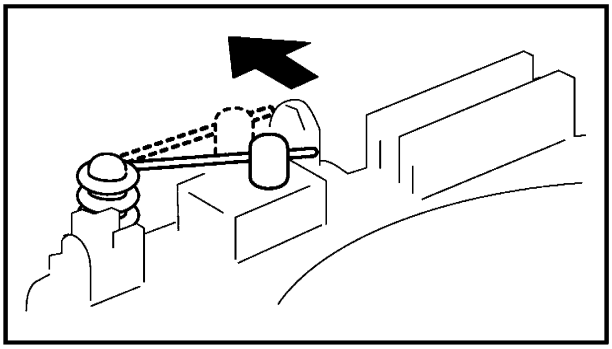
1. Check:
   - Carburetor body
     Cracks/damage → Replace.
     Contamination → Clean.
2. Check:
   - Main jet
   - Pilot jet
   - Main nozzle
     Contamination → Clean.
3. Check:
   - Needle valve
     Grooved wear → Replace.
4. Check:
   - Float
     Cracks/damage → Replace.

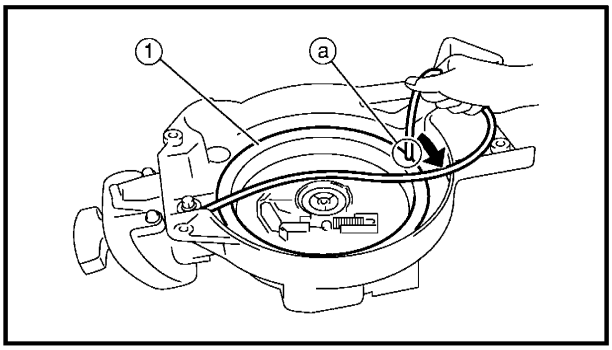


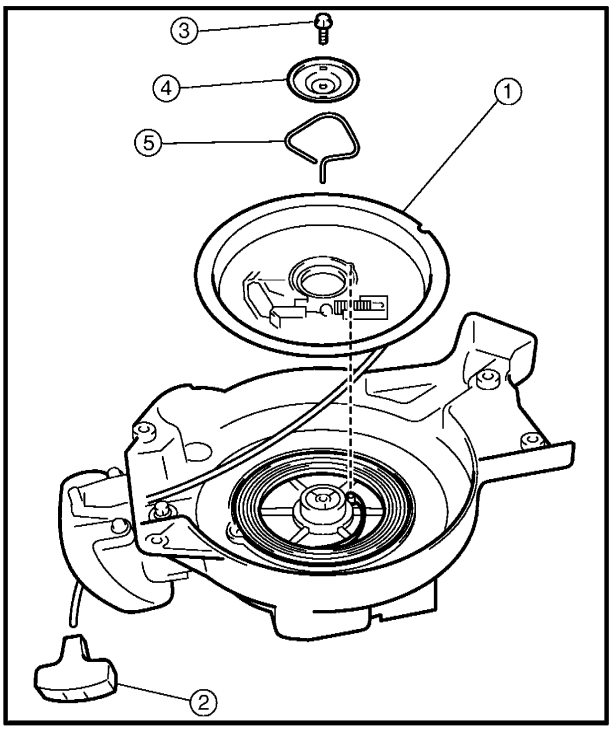
ASSEMBLING THE CARBURETOR

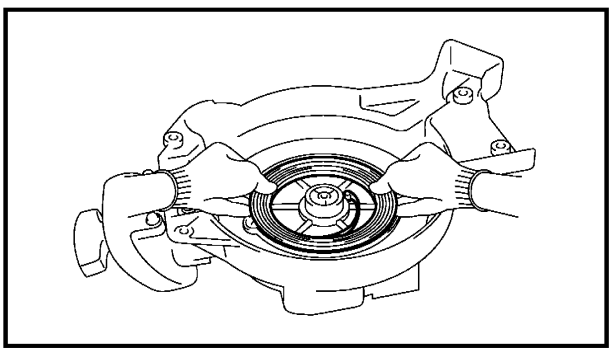
NOTE:
Before assembling the carburetor, make sure to turn out the pilot screw the same number of times, as noted before disassembly, from the seated position to the set position.

1. Install:
   - Needle valve
   - Float ①
   - Float pin ②
   - Screw ③









REMOVING THE SHEAVE DRUM

Remove:

- Sheave drum ①

  Turn the sheave drum clockwise until the spiral spring is free.

Removing steps

(1) Release the lock.

(2) Pull out the starter rope and make it hooked by the cutaway ⓐ on the sheave drum.

(3) Turn the sheave drum clockwise.

(4) Take off the starter rope from the starter handle ②.

(5) Remove bolts ③, drive plate ④, drive pawl spring ⑤, and sheave drum ①.

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 cutaway ⓐ.

⚠ WARNING

When removing the sheave drum, be sure to make it slow and steady to prevent the spiral spring from popping up at you.

REMOVING THE SPIRAL SPRING

Remove:

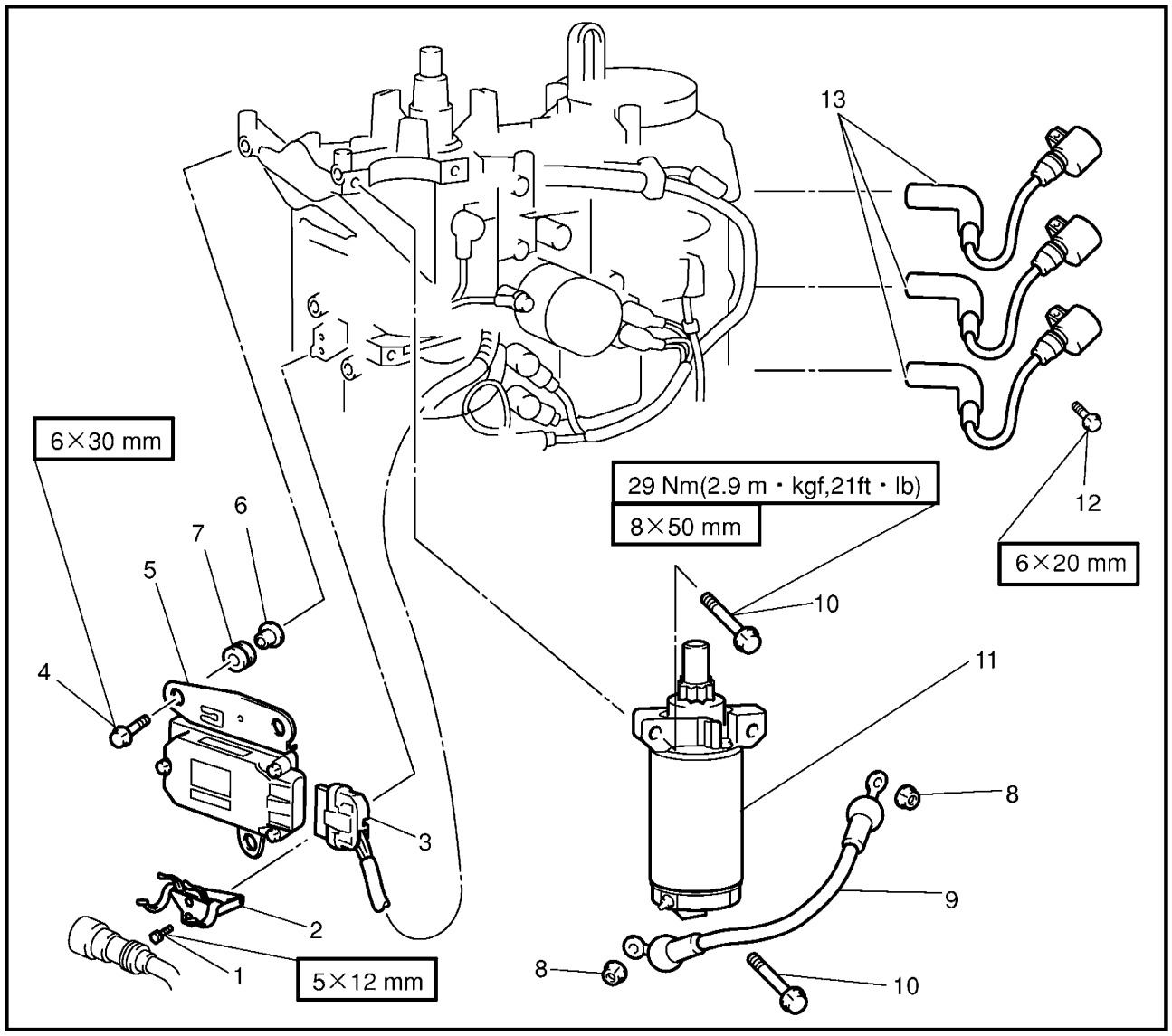
- Spiral spring

⚠ WARNING

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

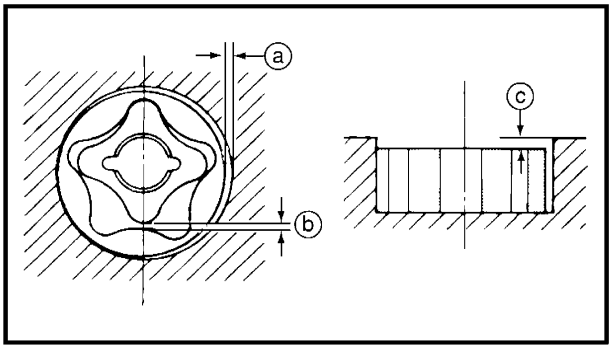
ELECTRICAL UNIT

REMOVING/INSTALLING THE ELECTRICAL UNIT 1



Order	Job/Part	Q'ty	Remarks
1	Bolt	2	
2	Bracket	1	
3	CDI unit coupler	1	
4	Bolt	3	
5	CDI unit assembly	1	
6	Collar	3	
7	Grommet	3	
8	Nut	2	
9	Starter motor lead	1	
10	Bolt	3	
11	Starter motor	1	
12	Bolt	3	

Continued on next page.



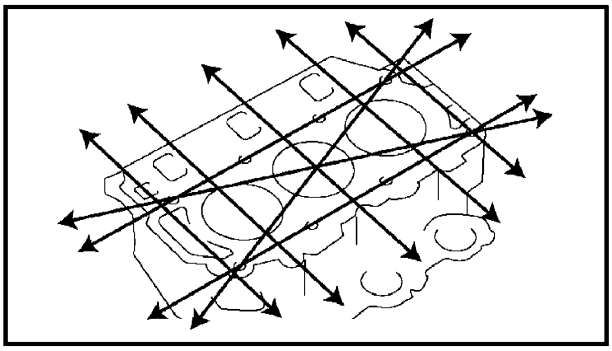
CHECKING OIL PUMP

Measure:

- Clearance ⓐ
- Clearance ⓑ
- Clearance ⓒ

  Out of specification → Replace.

Clearance
ⓐ0.03 - 0.15 mm (0.001 - 0.006 in)
ⓑ0 - 0.12 mm (0 - 0.005 in)
ⓒ0.03 - 0.08 mm (0.001 - 0.003 in)

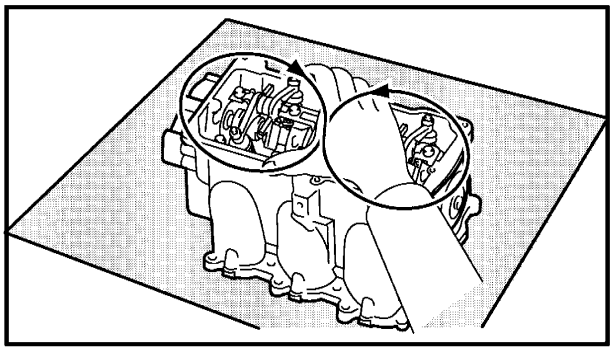


CHECKING THE CYLINDER HEAD

1. Measure:
   - Cylinder head warpage

     Out of specification → Reface.

Warpage limit
0.1 mm (0.004 in)

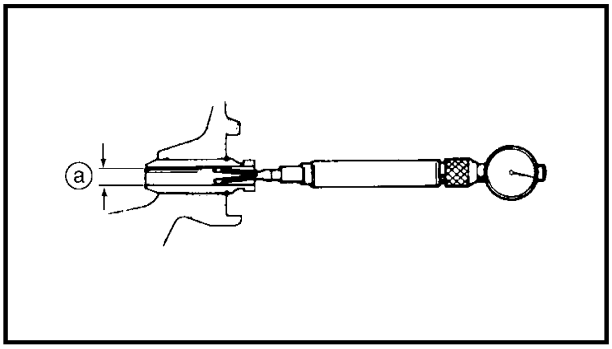


Resurfacing steps

(1) Place a 400 - 600 grit wet sandpaper on the surface plate.

(2) Resurface the cylinder head using a figure-eight sanding pattern.

NOTE:
To ensure an even surface, rotate the cylinder head several times.

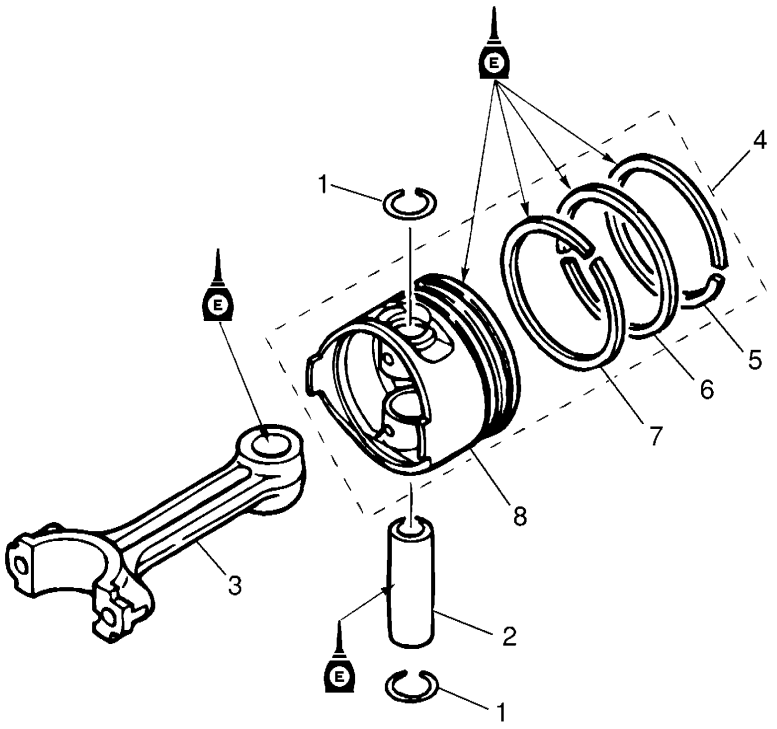


2. Measure:
   - Valve guide bore ⓐ

     Out of specification → Replace the guide.

Valve guide bore limit
5.500 - 5.512 mm (0.2165 - 0.2170 in)

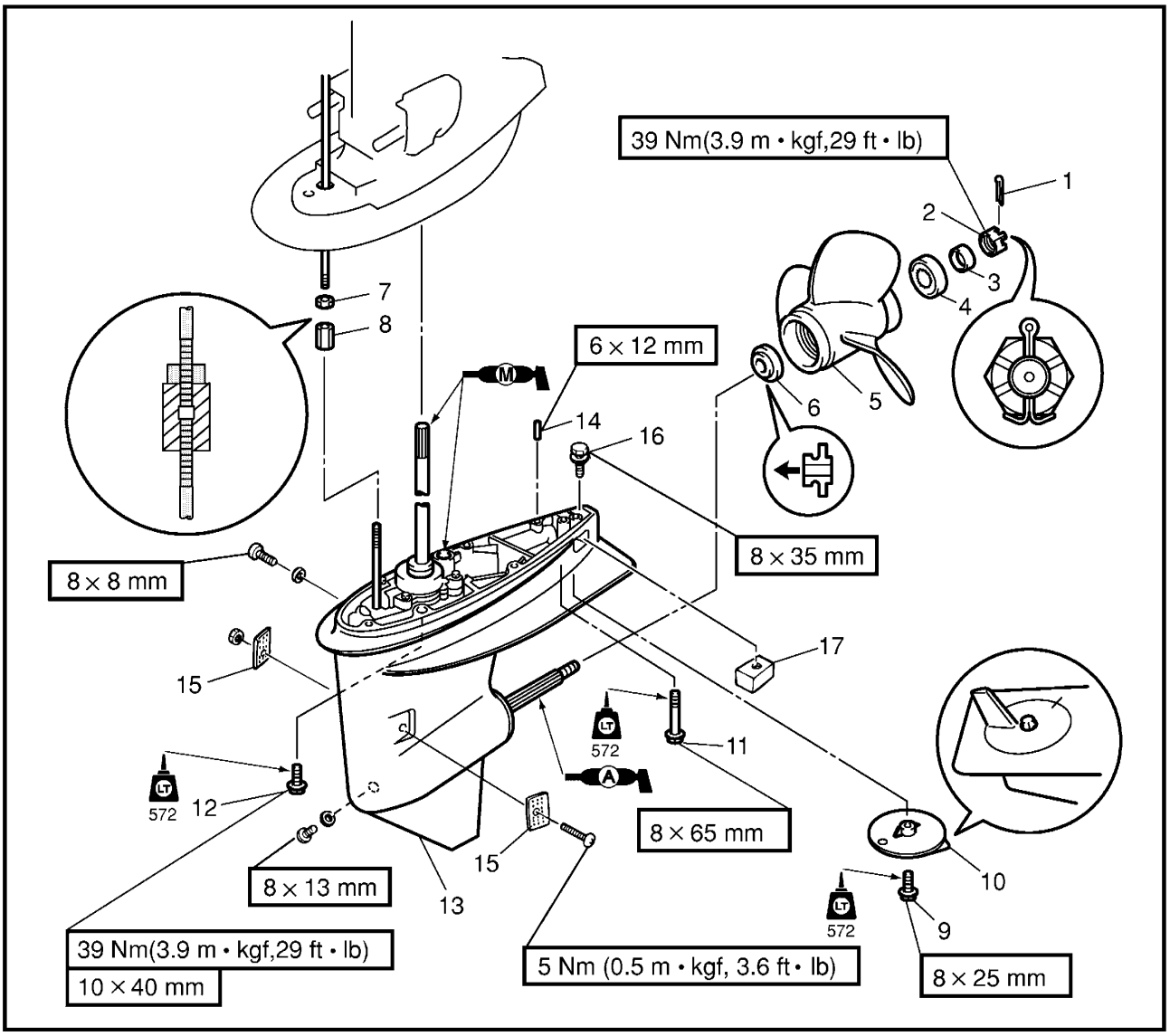
DISASSEMBLING/ASSEMBLING THE PISTON



Order	Job/Part	Q'ty	Remarks
1	Piston pin clip	2	**Not reusable**
2	Piston pin	1	
3	Connecting rod	1	
4	Piston assembly	1	
5	Top ring	1	
6	Second ring	1	
7	Oil ring	1	
8	Piston	1	
			For assembly, reverse the disassembly procedure.

LOWER UNIT

REMOVING/INSTALLING THE LOWER UNIT



Order	Job/Part	Q'ty	Remarks
1	Cotter pin	1	**Not reusable**
2	Propeller nut	1	
3	Bushing	1	
4	Spacer	1	
5	Propeller	1	
6	Collar	1	
7	Locknut	1	
8	Adjusting nut	1	
9	Bolt	1	
10	Trim tab	1	
11	Bolt	1	
12	Bolt	4	
13	Lower unit	1	

Continued on next page.

CHECKING THE DOG CLUTCH

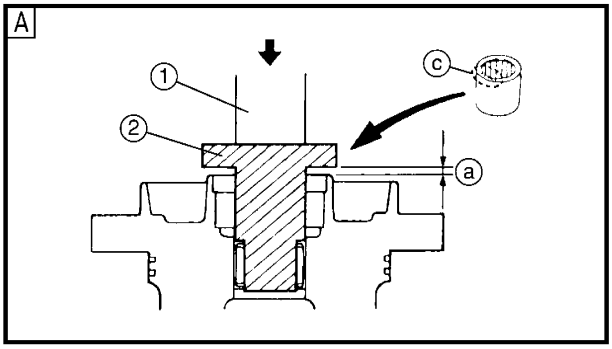
Check:
- Dog clutch
  Damage/wear → Replace.

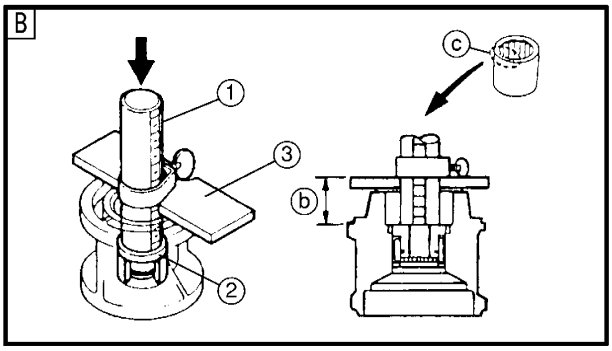
CHECKING THE PROPELLER SHAFT

Check:
- Propeller shaft
  Damage/wear → Replace.

ASSEMBLING THE PROPELLER SHAFT HOUSING ASSEMBLY

1. Install:
   - Needle bearing





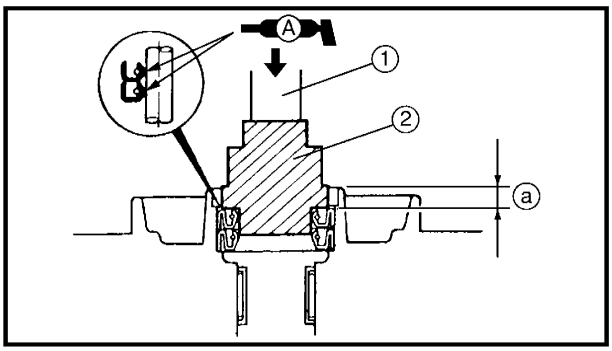
Needle bearing position	ⓐ
3.0-3.5 mm (0.12-0.14 in)	
Needle bearing position	ⓑ
23.0-23.5 mm (0.91-0.93 in)	

Driver rod-SS	①
YB-06071/90890-06604	
Bearing/oil seal attachment	②
YB-06111/90890-06614	
Bearing/oil seal depth plates	③
90890-06603	

NOTE:
Install the needle bearing with its manufacturer's marks ⓒ facing up.

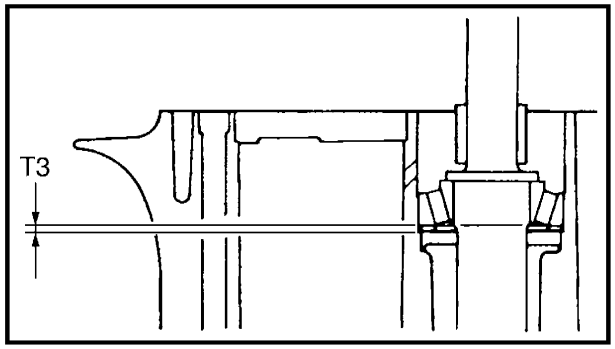
A For USA and Canada
B Except for USA and Canada

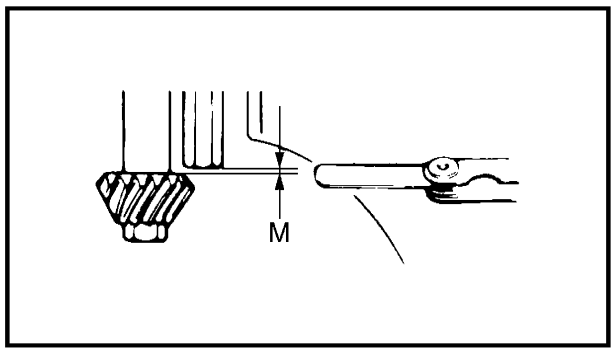
2. Install:
   - Oil seals

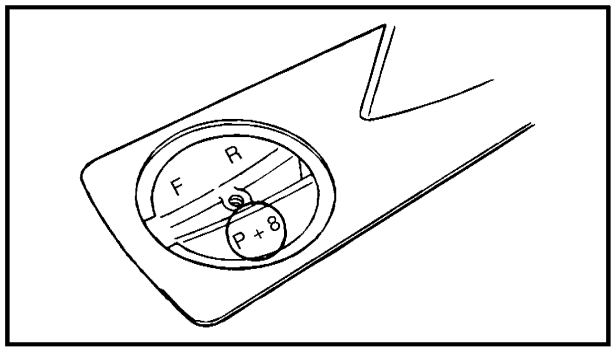


Oil seal position	ⓐ
4.0-4.5 mm (0.16-0.18 in)	

Driver rod	①
YB-06071/90890-06606	
Bearing/oil seal attachment (oil seal installer)	②
YB-06168/90890-06637	







SHIMMING (FOR USA AND CANADA)

SELECTING THE PINION SHIMS

NOTE:
Find the shim thickness (T3) by selecting shims until the specified value (M0) is obtained with the special tool.

1. Measure:
   - Specified measurement (M)
     Out of specified value (M0) → Adjust.

Specified value (M0) =
0.3 + P/100 mm

Measuring steps

(1) Calculate the specified value (M0).

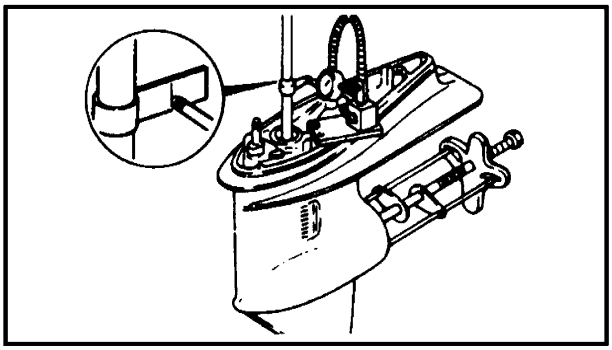
NOTE:
- "P" is the deviation of the lower case dimension from standard. It is stamped on the trim tab mounting surface of the lower case in 0.01mm units. If the "P" mark is missing or unreadable, assume a "P" value of "0", and check the backlash when the unit is assembled.
- If the "P" mark is negative (-), then subtract the "P" value from the measurement.

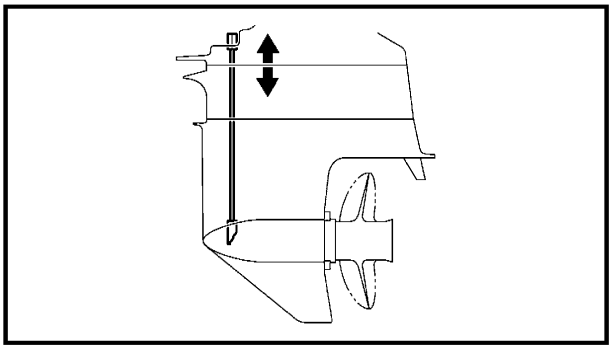
Example:
If "P" is "+5", then:
M = 0.3 + (+5)/100 mm
= 0.3 + 0.05 mm
= 0.35 mm (0.014 in)
If "P" is "-3", then:
M = 0.3 + (-3)/100 mm
= 0.3 - 0.03 mm
= 0.27 mm (0.011 in)

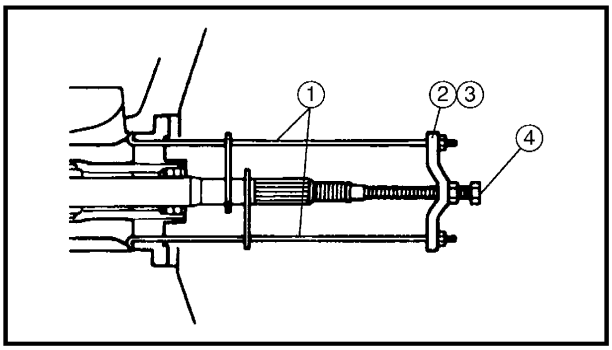
BACKLASH

NOTE:

- Do not install the water pump components when measuring the backlash.
- Measure both the forward and reverse gear backlashes.
- If both the forward and reverse gear backlashes are larger than specification, the pinion gear may be too high.
- If both the forward and reverse gear backlashes are smaller than specification, the pinion gear may be too low.







MEASURING THE FORWARD GEAR BACKLASH

1. Measure:
   - Forward gear backlash

     Out of specification → Adjust.

	Forward gear backlash **0.1-0.3 mm (0.004-0.012 in)**

Measuring steps

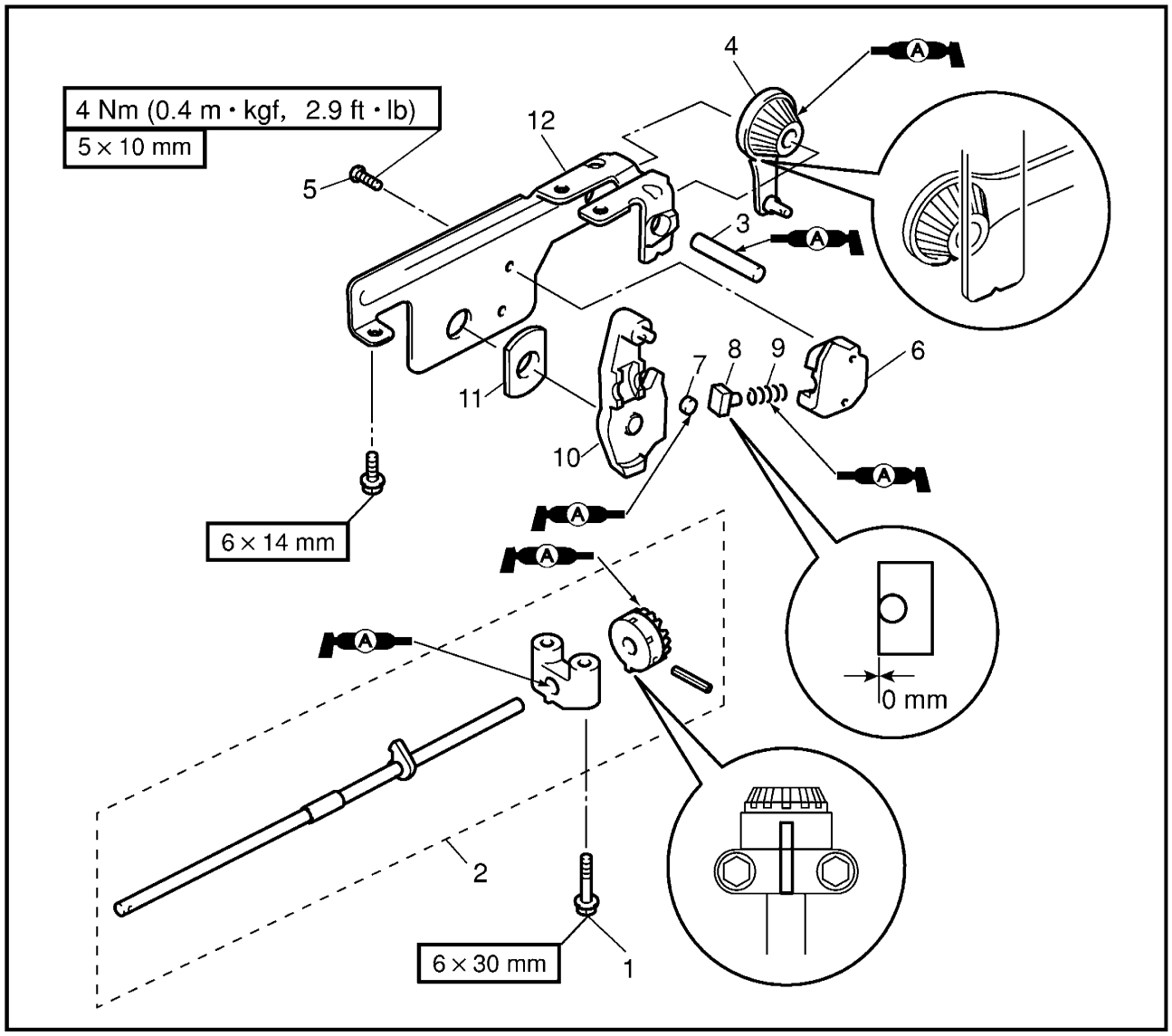
(1) Set the shift rod into the neutral position.

	Shift rod wrench **YB-06052/90890-06052**

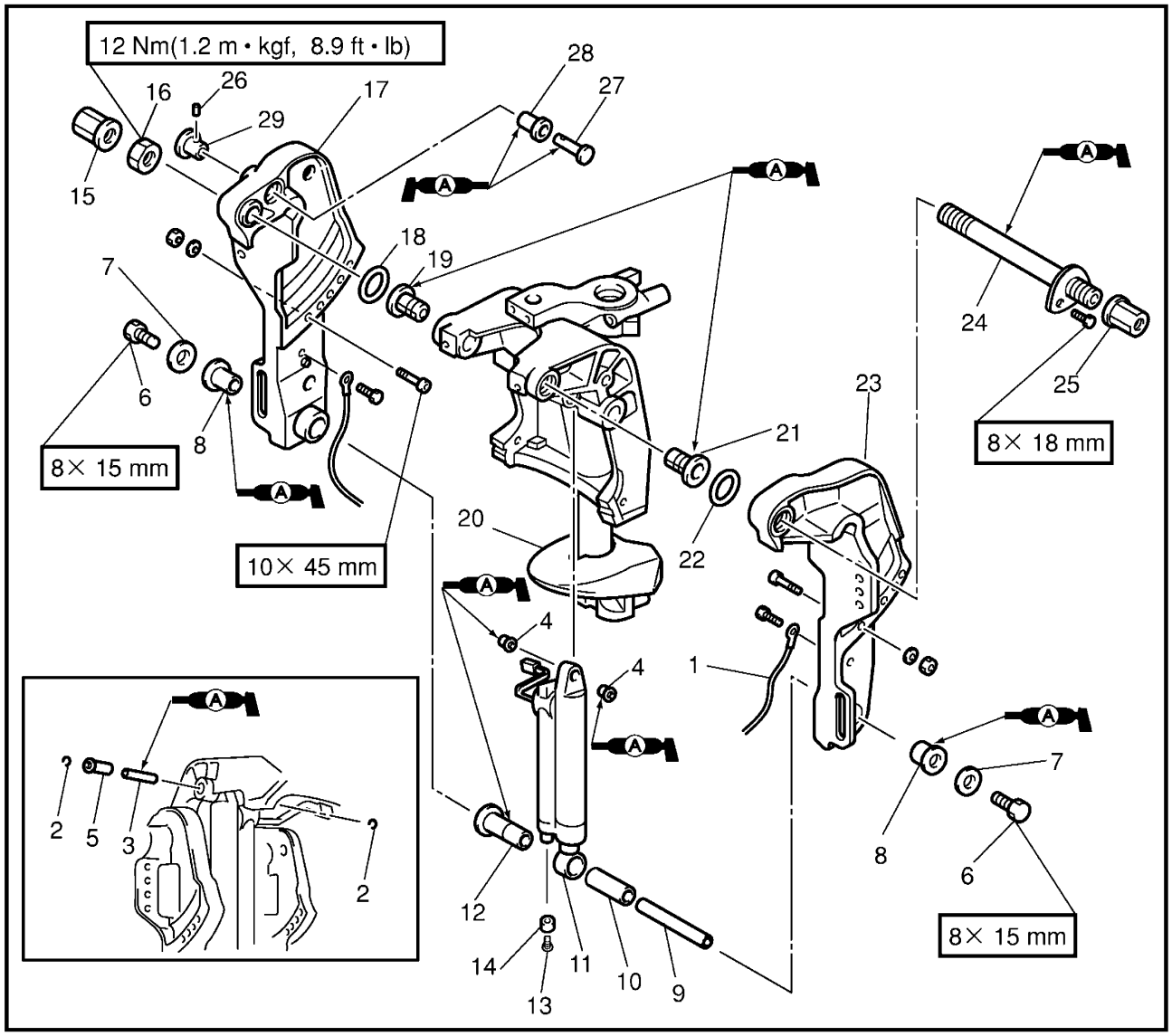
(2) Install the propeller shaft housing puller so it pushes against the propeller shaft.

	Propeller shaft housing puller ..... ① **YB-06234/90890-06503** **Universal puller** ..... ② **YB-06117** **Guide plate** ..... ③ **90890-06501** **Center bolt** ..... ④ **90890-06504**
	Center bolt **5 Nm (0.5 m•kgf, 3.6 ft•lb)**

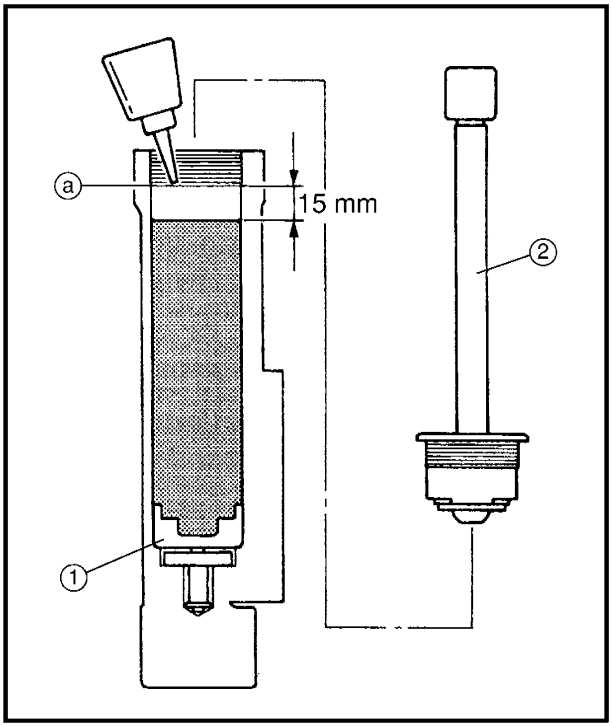
DISASSEMBLING/ASSEMBLING THE LINK ASSEMBLY



Order	Job/Part	Q'ty	Remarks
1	Screw	2	
2	Throttle shaft assembly	1	
3	Throttle arm shaft	1	
4	Throttle arm	1	
5	Screw	2	
6	Spring guide	1	
7	Roller	1	
8	Actuator	1	
9	Spring	1	
10	Cam plate	1	
11	Bushing	1	
12	Frame	1	
			For assembly, reverse the disassembly procedure.



Order	Job/Part	Q'ty	Remarks
23	Port clamp bracket	1	
24	Through tube	1	
25	Cap	1	
26	Spring pin	1	
27	Stopper shaft	1	
28	Bushing	1	
29	Stopper knob	1	
			For installation, reverse the removal procedure.



ASSEMBLING THE TILT CYLINDER ASSEMBLY

1. Install:
   - Free piston ①

NOTE:
Push the free piston down until it is fully compressed at the bottom of the tilt cylinder.

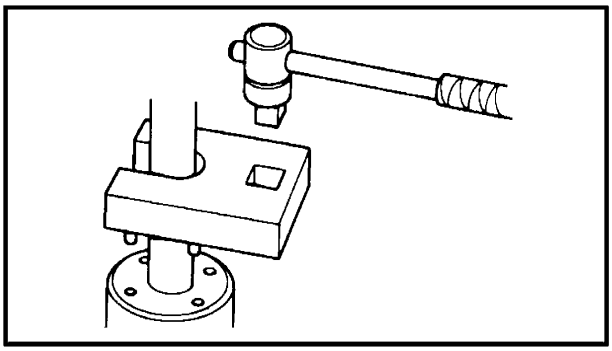
2. Fill:
   - Tilt cylinder

	Recommended Power trim and tilt fluid **ATF Dexron II**

NOTE:
Fill the cylinder with Power trim and tilt fluid. Add Power trim and tilt fluid until it is approximately 15 mm below the last thread ⓐ on the cylinder as shown.

3. Install:
   - Tilt ram assembly ②

NOTE:
When installing the tilt ram assembly., make sure that the tilt ram is fully extended.

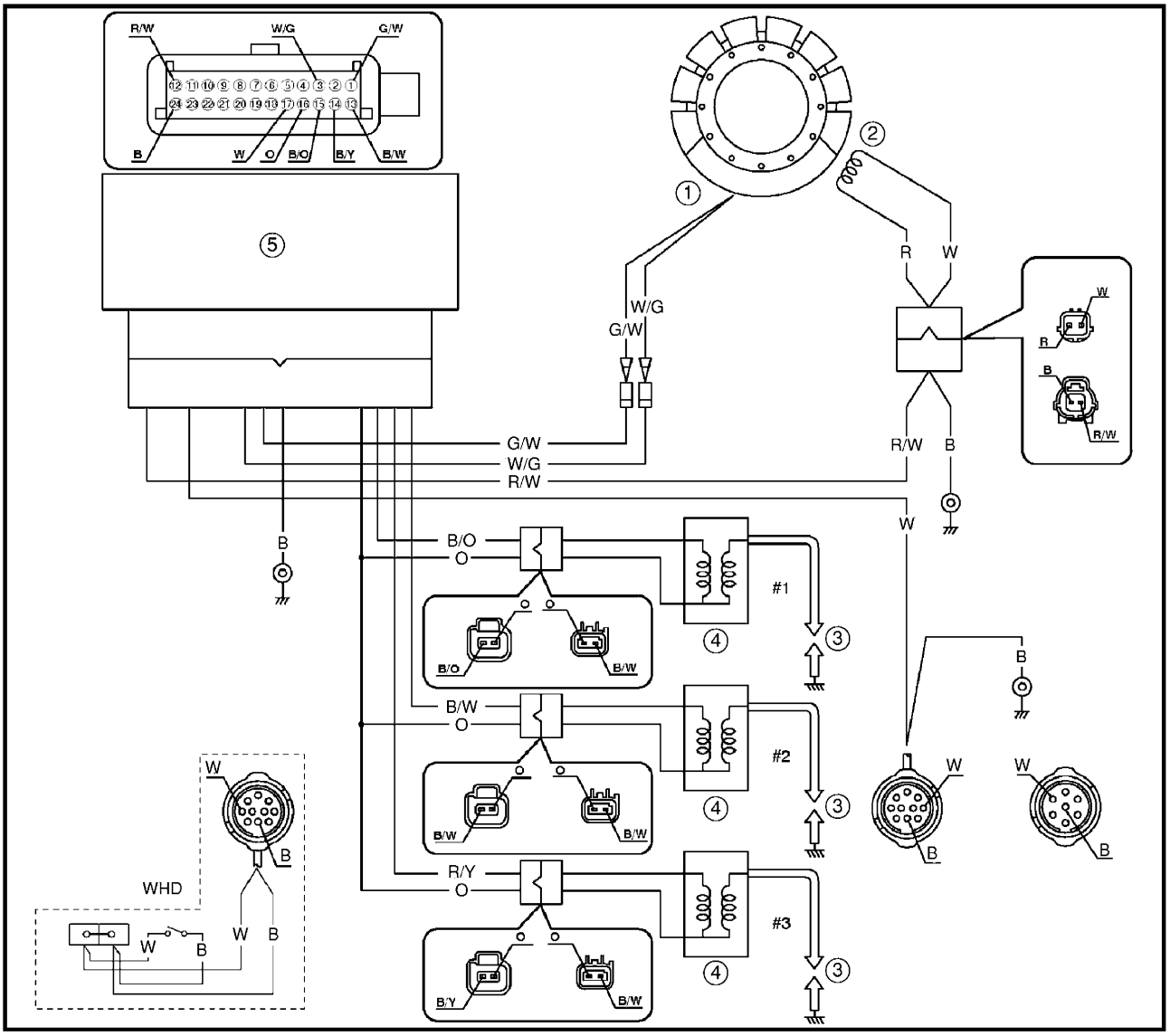


4. Tighten:
   - Tilt cylinder end screw

	Tilt cylinder wrench **YB-06175-2B/90890-06544**
	Tilt cylinder end screw **90 Nm (9.2 m•kgf, 66.4 ft•lb)**

CHAPTER 8
ELECTRICAL SYSTEM

IGNITION SYSTEM (ER, TR)



① Charge coil
② Pulser coil
③ Spark plugs
④ Ignition coils
⑤ CDI unit

B : Black
G : Green
O : Orange
R : Red
W : White
B/O : Black/orange
B/W: Black/white
B/Y : Black/yellow
G/W: Green/white
R/W: Red/white
W/G: White/green

CHECKING THE BATTERY

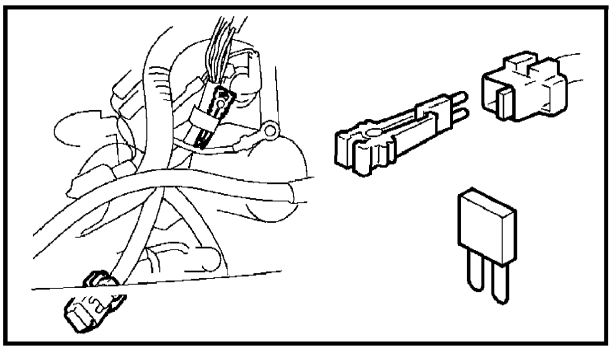
Refer to "CHECKING THE BATTERY" on page 3-18.

CHECKING THE FUSES

1. Check:
   - Fuse holder continuity

     No continuity → Check the fuse holder leads.
2. Check:
   - Fuse holder lead continuity

     No continuity → Replace the fuse holder.
     Continuity → Check the fuse.



3. Check:
   - Fuse continuity

     No continuity → Replace.
   - Fuse rating

     Out of specification → Replace.

Fuse rating
12 V - 20 A

CHECKING THE WIRE HARNESS CONTINUITY

Check:
- Wire harness continuity

  No continuity → Replace.