CONTENTS

PREFACE

This manual covers construction, function and servicing procedures of Honda BF20·BF2A outboard motors.

Careful observance of these instructions will result in better, safer service work.

HONDA MOTOR CO., LTD.
SERVICE PUBLICATIONS OFFICE

1. SPECIFICATIONS

DIMENSIONS AND WEIGHTS

Item \ Model		BF2OS	BF2OL	BF2AS	BF2AL
Length	mm (in)	410 (16.1)			
Width	mm (in)	275 (10.8)			
Height	mm (in)	930 (36.6)	1,080 (42.5)	930 (36.6)	1,080 (42.5)
Dry weight	kg (lb)	12.5 (27.6)	13.0 (28.7)	12.5 (27.6)	13.0 (28.7)
Operating weight	kg (lb)	13.6 (30.0)	14.0 (30.9)	13.6 (30.0)	14.0 (30.9)
Transom height	mm (in)	420 (16.5)	570 (22.4)	420 (16.5)	570 (22.4)
Transom angle		4 stages (5°–10°–15°–20°)			
Tilting stage		1 stage			
Tilting angle		75°			
Turning angle		360°			

ENGINE

Type	4-stroke, side valve, 1 cylinder	
Displacement	76 cm^3 (4.6 cu in)	
Bore and stroke	46 x 46 mm (1.8 x 1.8 in)	
Max. horsepower	2.0 HP/5,000 rpm [At propeller shaft]	
Max. torque	0.62 kg-m (4.5 ft-lb)	
Compression ratio	6.5 : 1	
Fuel consumption	400 g/HPh	
Cooling system	Forced-air cooling (Water cooling for exhaust system)	
Ignition system	Transistorized magneto	
Ignition timing	20° B.T.D.C. (Fixed)	
Spark plug	BMR-4A (NGK)	BMR-4A (NGK), W14MR-U (ND)
Carburetor	Horizontal-type butterfly valve	
Lubrication system	Splash-type	
Oil capacity	0.4ℓ (0.42 US qt)	
Starting system	Recoil starter	
Stopping system	Grounding primary circuit	
Fuel tank capacity	1.0ℓ (0.26 US gal)	
Fuel	Regular grade automobile gasoline	
Exhaust system	Underwater exhaust system.	

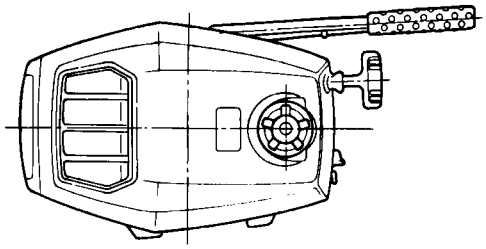
LOWER UNIT

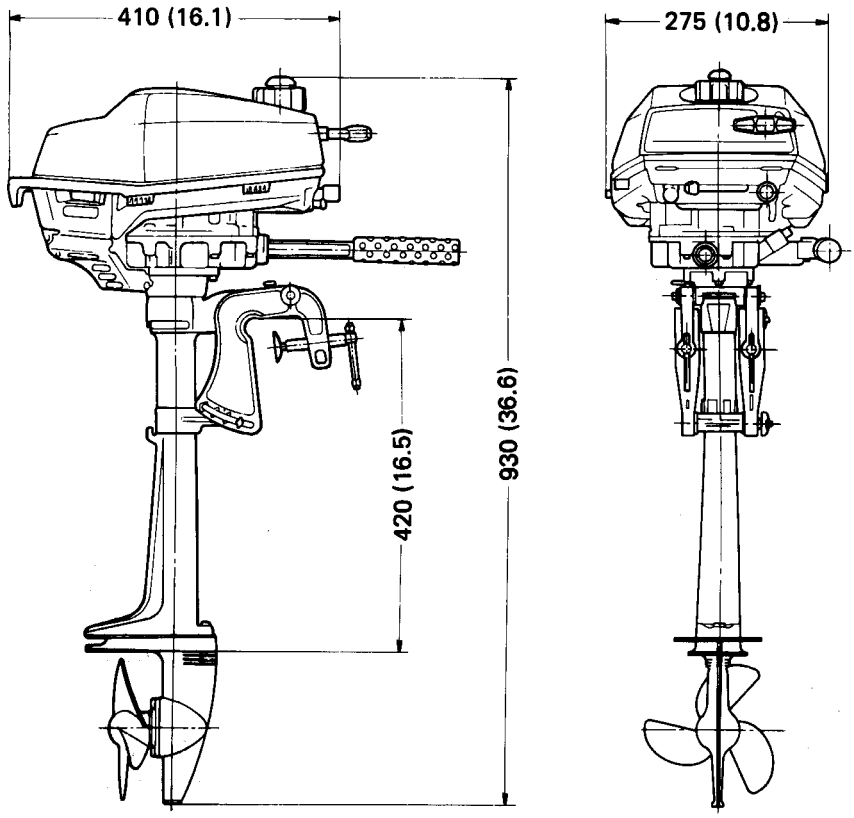
Gear ratio	13 : 28
Gear case oil capacity	0.05ℓ (0.053 US qt)
Propeller (No. of blades–dia. x pitch)	3–184 x 120 mm (3–7.2 x 4.7 in)
Rotating direction	Clockwise (viewed from rear)

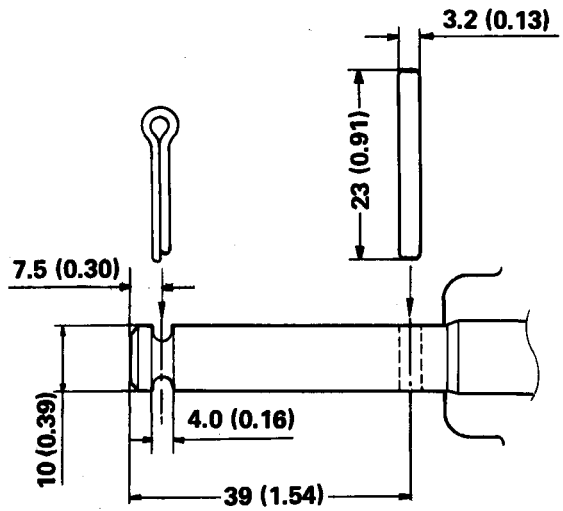
2. DIMENSIONAL DRAWINGS

UNIT: mm (in)

Illustrations are based on model BF20S.







II. SERVICE INFORMATION

1. GENERAL SAFETY

Pay attention to these symbols and their meaning:

⚠ WARNING **Indicates a strong possibility of severe personal injury or loss of life if instructions are not followed.**

CAUTION: Indicates a possibility of personal injury or equipment damage if instructions are not followed.

⚠ WARNING

Stop the engine and remove the spark plug before servicing.
If the motor must be running to do some work, make sure the area is well ventilated. Never run the engine in a closed area.
The exhaust contains poisonous carbon monoxide gas.

⚠ WARNING

Gasoline is extremely flammable and is explosive under certain conditions. Do not smoke or allow flames or sparks in your working area.

CAUTION:

Keep away from rotating or hot parts and high tension wires when the engine is run with the cover off.

2. SERVICE RULES

1. Use genuine Honda or Honda-recommended parts and lubricants or their equivalents. Parts that do not meet Honda's design specifications may damage the unit.
2. Use the special tools designed for the product.
3. Install new gaskets, O-rings, etc. when reassembling.
4. When torquing bolts or nuts, begin with larger-diameter or inner bolts first and tighten to the specified torque diagonally, unless a particular sequence is specified.
5. Clean parts in cleaning solvent upon disassembly. Lubricate any sliding surface before reassembly.
6. After reassembly, check all parts for proper installation and operation.
7. Many screws used in this machine are self-tapping. Be aware that cross-threading or overtightening these screws will strip the female threads and ruin the hole.
8. Use only metric tools when servicing this unit. Metric bolts, nuts and screws are not interchangeable with nonmetric fasteners. The use of incorrect tools and fasteners may damage the unit.
9. Follow the instructions represented by these symbols when they are used:

p. : Indicates the reference page

0 x 0 (○): Indicates the type and quantity of bolts used.

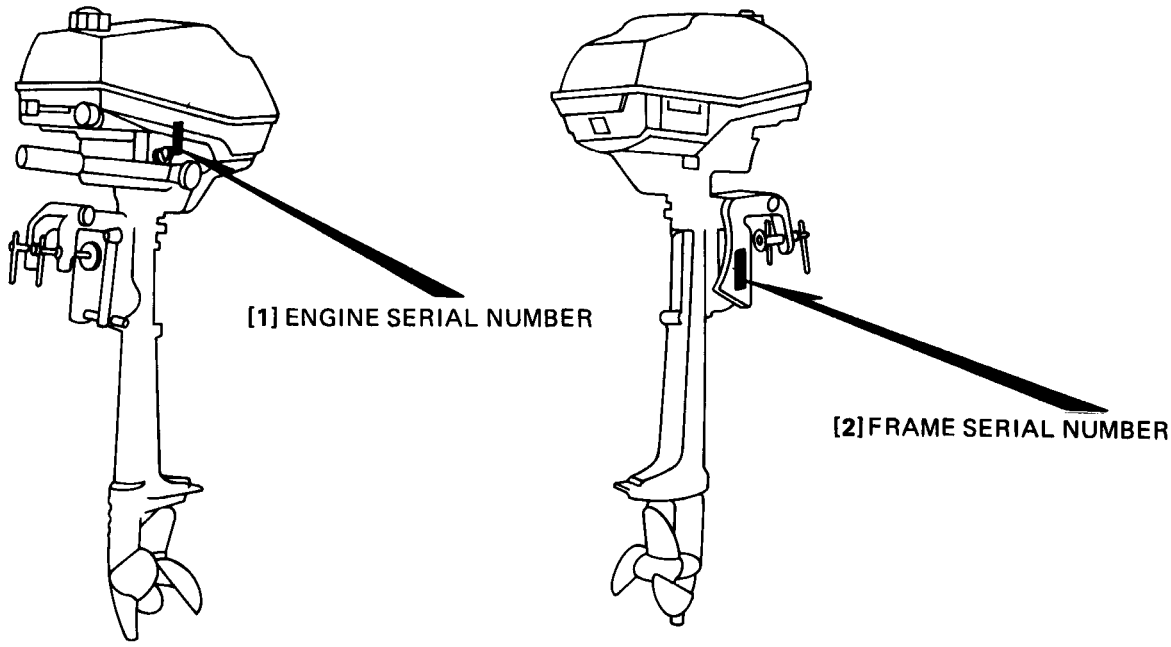
: Apply oil.

: Apply grease.

: Use special tool.

3. SERIAL NUMBER LOCATION

The serial numbers are stamped on the engine and the stern bracket as illustrated below. Always give these numbers when inquiring about the outboard motor or ordering parts to be sure you get the correct parts.



4. MAINTENANCE STANDARDS

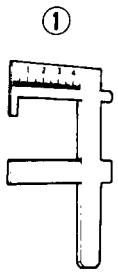
PART	ITEM	STANDARD	SERVICE LIMIT
Engine	Idle speed	1400±100 min^{-1} (rpm)	—
	Cylinder compression	6.5kg/cm^2 (92.4 lbs/in^2)[800 min^{-1}(rpm)]	—
Carburetor	Main jet	#70	—
	Pilot screw BF20S:	2 turns (Engine serial number 1000001–1007046)	—
		1-3/4 turns(Engine serial number 1007047 and subsequent)	—
	BF20L, BF2A:	2-1/8 turns	—
	Float height	10.5–13.5 mm (0.413–0.531 in)	—
Spark plug	Gap	0.6–0.7 mm (0.024–0.028 in)	—
Transistor unit	Primary side	0.7–0.9Ω	—
	Secondary side	6.3–7.7KΩ	—
	Air gap	0.2–0.6 mm (0.008–0.024 in)	—
Valve	Valve clearance IN	0.08–0.16 mm (0.003–0.006 in)	—
	EX	0.08–0.16 mm (0.003–0.006 in)	—
	Stem O.D. IN	5.490 mm (0.216 in)	5.45 mm (0.215 in)
	EX	5.445 mm (0.214 in)	5.40 mm (0.213 in)
	Guide I.D. IN/EX	5.50 mm (0.217 in)	5.56 mm (0.219 in)
	Stem-to-guide clearance IN	0.010 mm (0.0004 in)	0.11 mm (0.004 in)
	EX	0.055 mm (0.0022 in)	0.16 mm (0.006 in)
	Seat width IN/EX	0.7 mm (0.028 in)	1.0 mm (0.04 in)
	Spring free length	27.1 mm (1.07 in)	25.0 mm (0.98 in)
Cylinder	Sleeve I.D.	46.00 mm (1.8110 in)	46.05 mm (1.813 in)
Piston	Skirt O.D.	45.995 mm (1.8108 in)	45.92 mm (1.808 in)
	Piston-to-cylinder clearance	0–0.03 mm (0–0.0012 in)	0.13 mm (0.0051 in)
	Pin bore I.D.	10.002 mm (0.3938 in)	10.05 mm (0.3957 in)
Piston pin	O.D.	10.00 mm (0.3937 in)	9.95 mm (0.3917 in)
	Pin-to-pin bore clearance	0.015 mm (0.0006 in)	0.10 mm (0.0039 in)
Piston ring	Width Top/Second	1.5 mm (0.0591 in)	1.37 mm (0.0539 in)
	Side clearance Top	0.055–0.090 mm (0.0022–0.0035 in)	0.15 mm (0.0059 in)
	Second	0.055–0.085 mm (0.0022–0.0033 in)	0.15 mm (0.0059 in)
	End gap Top/Second	0.15–0.035 mm (0.0059–0.014 in)	1.0 mm (0.039 in)
	Oil	0.2–0.8 mm (0.0079–0.031 in)	1.0 mm (0.039 in)
Connecting rod	Small end I.D.	10.006 mm (0.3939 in)	10.05 mm (0.3957 in)
	Rod-to-pin clearance	0.006–0.023 mm (0.00024–0.00091 in)	0.10 mm (0.0039 in)
	Big end oil clearance	0.016–0.038 mm (0.00063–0.0015 in)	0.10 mm (0.0039 in)
	Big end axial clearance	0.20–0.90 mm (0.0079–0.035 in)	1.10 mm (0.043 in)
	Big end I.D.	18.00 mm (0.7087 in)	18.04 mm (0.7102 in)
Crankshaft	Crank pin O.D.	17.984 mm (0.7080 in)	17.94 mm (0.7063 in)
Camshaft	Cam height IN/EX	20.82 mm (0.8197 in)	20.47 mm (0.8059 in)
	Journal O.D.	12.184 mm (0.4797 in)	12.15 mm (0.4783 in)
Crankcase	Journal I.D.	12.20 mm (0.4803 in)	12.25 mm (0.4823 in)
Propeller shaft	O.D. at bevel gear	10.973–10.984 mm (0.4320–0.4324 in)	10.93 mm (0.4303 in)
Propeller shaft holder	Shaft bore I.D.	11.000–11.018 mm (0.4331–0.4338 in)	11.06 mm (0.4354 in)
	Shaft-to-shaft bore clearance	0.016–0.045 mm (0.0006–0.0018 in)	—
Vertical shaft	O.D. at gear case	10.973–10.984 mm (0.4320–0.4324 in)	10.93 mm (0.4303 in)
Gear case	Vertical shaft bore I.D.	11.000–11.018 mm (0.4331–0.4338 in)	11.06 mm (0.4354 in)
	Vertical shaft-to-bore clearance	0.016–0.045 mm (0.0006–0.0018 in)	—

5. TORQUE VALUES

Tightening points	Thread diameter	Torque
Flywheel	12 mm bolt	450–550 kg-cm (32.5–39.8 ft-lb)
Connecting rod	5 mm bolt	40–60 kg-cm (2.9-4.3 ft-lb)
Throttle cable clamp	6 mm bolt	45–55 kg-cm (3.3–4.0 ft-lb)
Engine switch	16 mm nut	8–12 kg-cm (0.6–0.9 ft-lb)
Standard torque	5 mm bolt, nut	40–70 kg-cm (2.9–5.1 ft-lb)
	6 mm bolt, nut	80–120 kg-cm (5.8–8.7 ft-lb)
	8 mm bolt, nut	200–280 kg-cm (14.5–20.2 ft-lb)
	10 mm bolt, nut	350–400 kg-cm (25.3–28.9 ft-lb)

6. SPECIAL TOOLS

	Tool Name	Tool number	Application
1	Float level gauge	07401–0010000	Carb. float level inspection
2	Pin driver, 2.5 mm	07744–0010100	2.5 mm spring pin removal/installation
3	Attachment, 32 x 35 mm	07746–0010100	Oil seal installation (Use with Tool No. 07746–0040500
4	Attachment, 37 x 40 mm	07746–0010200	Water seal installation (Use with Tool No. 07746–0040400)
5	Bearing driver, 22 mm	07746–0020100	Crankshaft timing gear installation
6	Pilot, 10 mm	07746–0040100	Gear case bearing installation
7	Pilot, 17 mm	07746–0040400	Water seal installation
8	Pilot, 20 mm	07746–0040500	Oil seal installation
9	Pilot, 22 mm	07746–0041000	Propeller shaft holder seal installation
10	Water seal removal	07748–0010000	Water seal removal
11	Driver	07749–0010000	Use with attachments and pilots
12	Valve seat cutter, 45°	07780–0010100	Valve seat reconditioning
13	Valve seat cutter, 32°	07780–0012000	
14	Valve seat cutter, 32°	07780–0012600	
15	Cutter holder	07781–0010100	
16	Bearing remover, 15 mm	07936–KC10500	11 x 21 x 8 mm Water seal removal
17	Remover weight	07936–3710200	Use with Tool No. 07936–KC10500
18	Valve guide driver	07942–8920000	Valve guide removal/installation
19	Valve holder	07972–8120000	Tappet adjuster disassembly/reassembly
20	Valve lapping guide	07975–8920000	Tappet adjuster lapping
21	Valve guide reamer, 5.5 mm	07984–2000000	Valve guide reaming
22	Digital volt-ohmmeter or Analog volt-ohmmeter	KS–AH–32–003 or, KS–TH–5H–1	Ignition coil and engine stop switch inspection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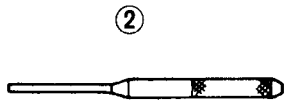
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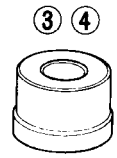
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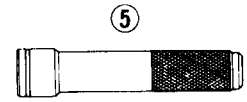
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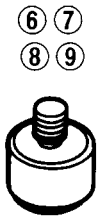
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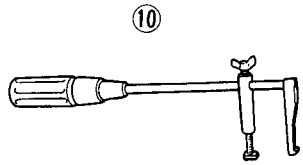
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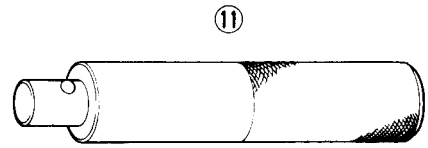
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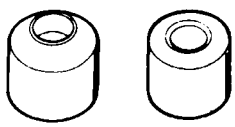
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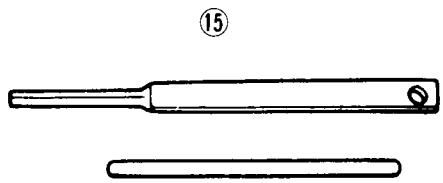
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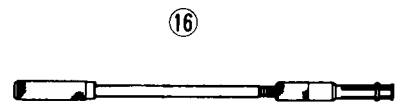
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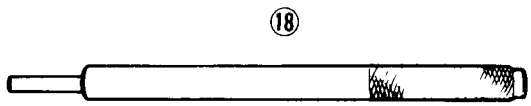
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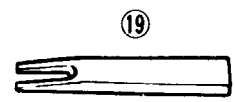
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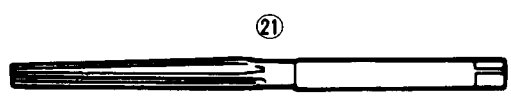
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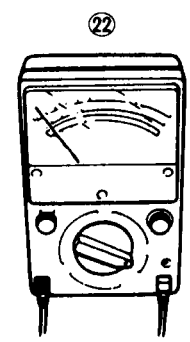
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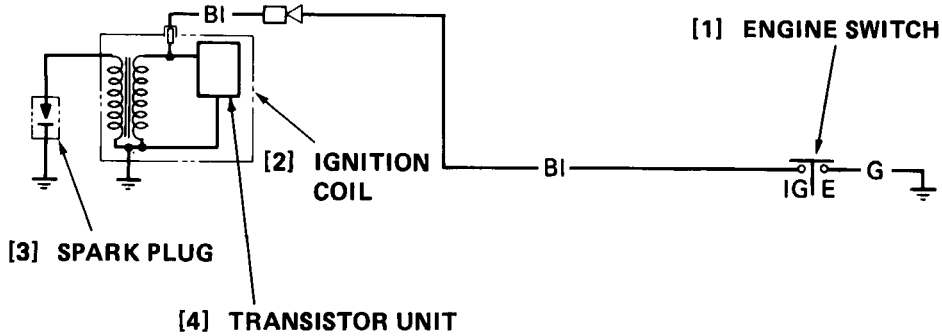
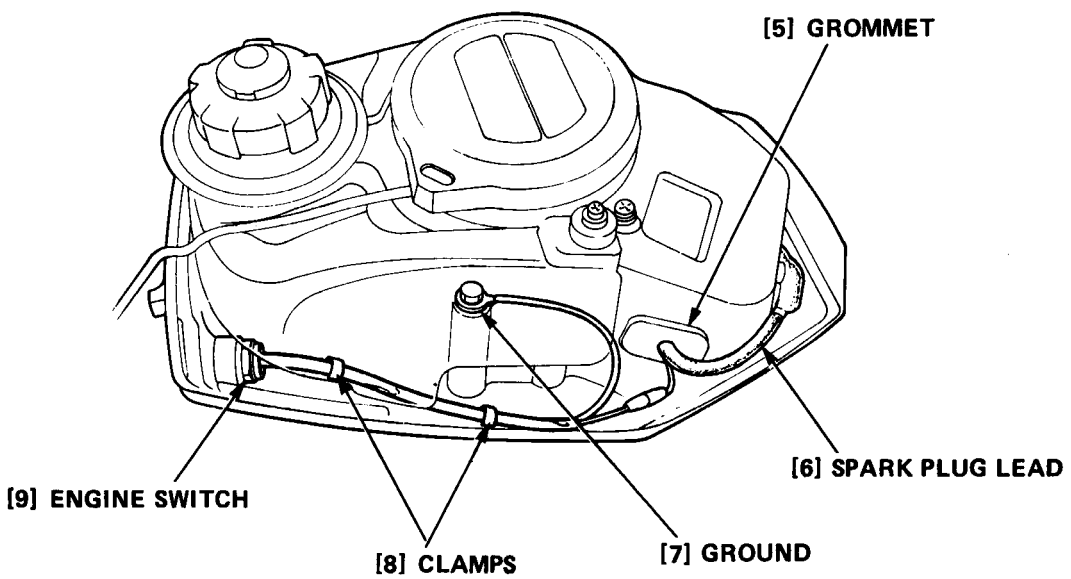
7. WIRING DIAGRAM





8. TROUBLESHOOTING

- ENGINE

a. Engine will not start.

Is there gasoline in the fuel tank? — NO → • Refill the fuel tank and restart the engine.

Yes ↓

Is the spark plug flooded? — NO → • Clogged fuel line, fuel valve, fuel filter or breather tube.
• Float valve malfunction in the carburetor.
• Clogged port or nozzle in the carburetor.

Yes ↓

Is there spark at the spark plug? — NO → • Faulty ignition system. (See page 13)

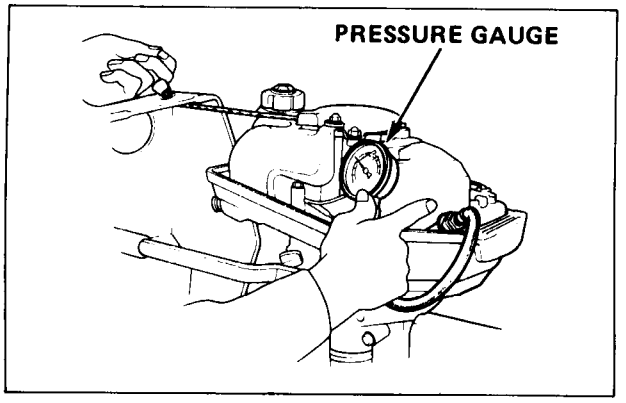
Yes ↓

Is there enough compression? See page 14 — NO → • Blown head gasket.
• Improperly tightened cylinder head.
• Poor valve seat contact.
• Worn cylinder, piston or piston rings.
• Cylinder head warpage.
• Less tappet clearance.
• Improper valve timing.

CYLINDER COMPRESSION TEST

1) Remove the spark plug and connect a pressure gauge to the plug hole.
2) Move the throttle lever to the FAST position, and operate the recoil starter until the highest reading is attained.

Standard cylinder compression	6.5 kg/cm^2 (92.4 lbs/in^2)/ 800 min^{-1} (r.p.m.)



b. ABNORMAL ENGINE SPEED

Engine starts but stops immediately.	• Fuel mixture too rich with choke valve closed. • Carburetor pilot screw out of adjustment. • Air leakage from carburetor insulator. • Defective spark plug. • Float valve malfunction.
Engine speed does not increase.	• Defective spark plug. • Choke valve stays closed. • Water in the carburetor. • Improper valve timing. • Poor valve seat contact. • Overheating.
Engine speed does not decrease.	• Faulty throttle valve shaft or linkage.
Engine speed does not stabilize. (Hunting)	• Carburetor pilot screw out of adjustment. • Clogged carburetor passages. • Air leakage from carburetor insulator. • Insufficient fuel in the fuel tank.

c. IGNITION SYSTEM TROUBLESHOOTING

Engine does not start with engine switch turned to ON. → Test the spark plug.

No spark → Check again with a new spark plug.
- Sparks → • Faulty spark plug. • Install new spark plug.

No spark → Check again with a new spark plug cap.
- Sparks → • Faulty spark plug cap. • Install new spark plug cap.

No spark → Disconnect the black wire from the engine switch and recheck.
- Sparks → • Faulty engine switch. • Replace engine switch.

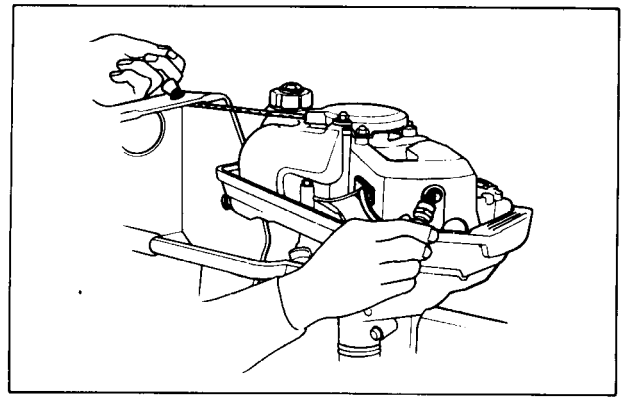
No spark → • Defective transistorized ignition coil. • Replace transistorized ignition coil.

- GEAR CASE

Water is detected in the gear oil. → • Worn or damaged water seal and gasket. • Improperly tightened fasteners on gear case. • Worn propeller shaft.

SPARK TEST

1) Remove the engine cover, plug cap and spark plug.
2) Attach the spark plug to the plug cap, and ground the side electrode against the 6 x 20 mm bolt.
3) Pull the recoil starter and check to see if sparks jump across the electrodes.



⚠ WARNING

- **Never hold the spark plug lead with wet hands while performing this test.**
- **Make sure that no fuel has been spilled on the engine—and that the plug is not wet with fuel.**
- **To avoid fire hazards, do not allow sparks near the plug hole.**

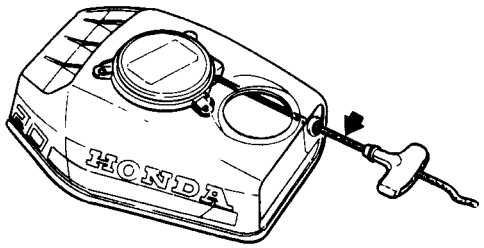
9. MAINTENANCE SCHEDULE

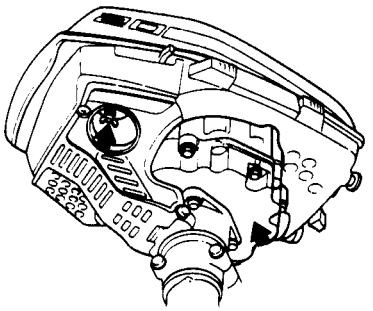
REGULAR SERVICE PERIOD Performed at every indicated month or operating hour intervals, whichever comes first. ITEM		EACH USE (3)	FIRST MONTH OR 20 HRS (2)	EVERY 6 MONTHS OR 100 HRS (2)	EVERY YEAR OR 200 HRS (2)
Engine oil	Check level	○			
	Change		○	○	
Gear case oil	Check level	○			
	Change		○		○
	Check for water contamination			○	
Starter rope	Check			○	
Carburetor linkage	Check		○		
Valve clearance	Check-Readjust		○		○
Spark plug	Clean-Readjust			○	
Shear pin	Check			○	
Lubrication	Grease			○(1)	
Fuel tank and filter	Clean				○
Combustion chamber and valves	Clean-Relap	Every 300 hours			
Fuel line	Check (Replace if necessary)	Every 3 years			

NOTE: (1) Lubricate more frequently when used in salt water.
(2) For professional commercial use, log hours of operation to determine proper maintenance interfals.
(3) To maintain cooling system efficiency, flush the outboard motor with fresh water after each use in salt water.

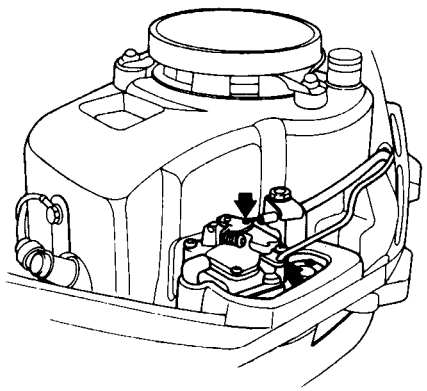
10. LUBRICATION CHART

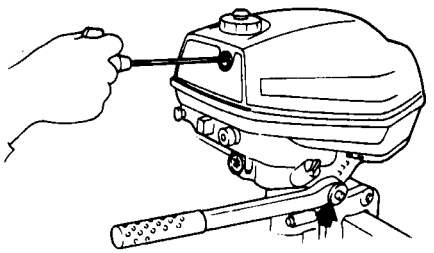
1. Wipe the outside of the engine with a cloth dipped in oil. Apply oil to the following parts.

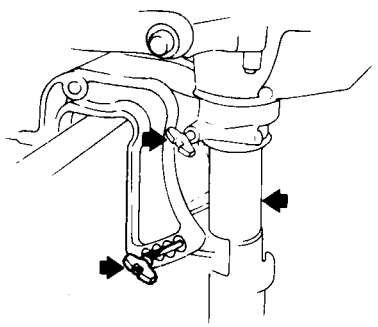


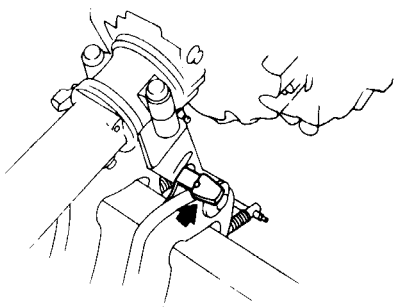


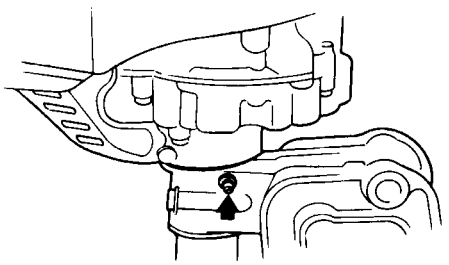
2. Apply marine anti-corrosion grease to the following parts.

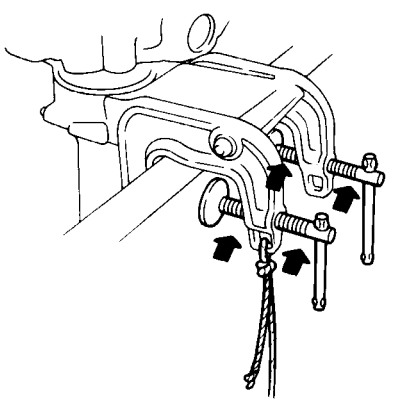












1. ENGINE OIL

CAUTION:

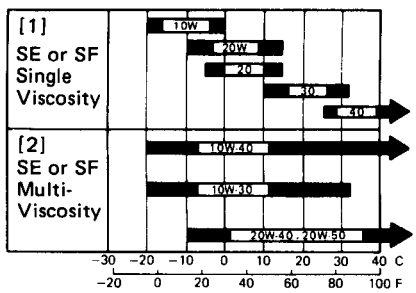
Used motor oil may cause skin cancer if repeatedly left in contact with the skin for prolonged periods. Although this is unlikely unless you handle used oil on a daily basis, it is still adviseable to thoroughly wash your hands with soap and water as soon as possible after handling used oil.

Drain the oil while the engine is still warm to assure rapid and complete draining.

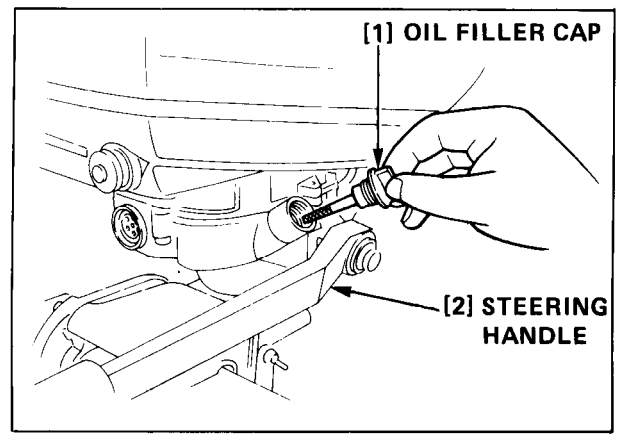
1. Turn the fuel valve lever OFF, and close the fuel cap vent knob.
2. Remove the oil filler cap, and turn the motor on its side to drain the oil.
3. Stand the engine in an upright position, and fill the crankcase with the recommended oil. Check the oil level with the dipstick resting on the filler opening (do not screw in). Fill to the upper level mark on the dipstick.

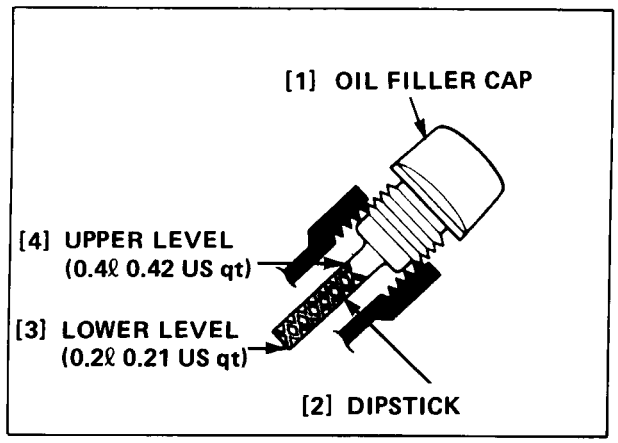
Engine oil capacity	0.4ℓ (0.42 US qt)

Recommended oil:
Select the appropriate viscosity for the average temperature in your area. SAE10W-40 is recommended for general, all-temperature use.



[3] Ambient temperature

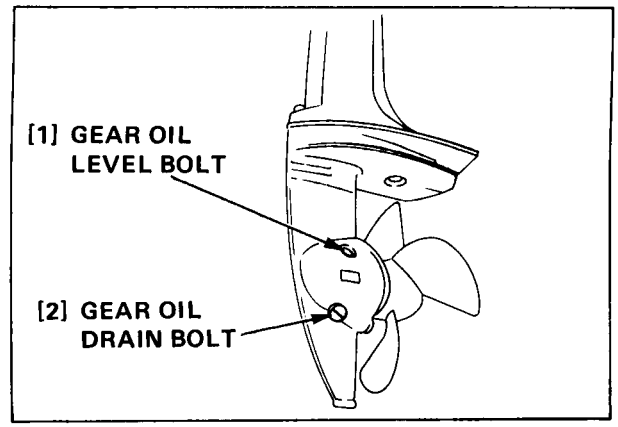




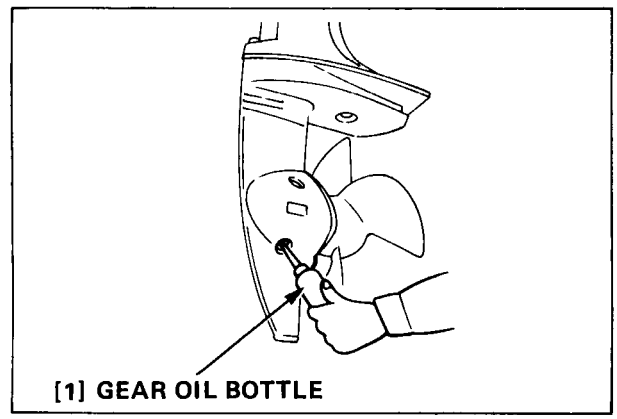
2. GEAR OIL

1) Remove the gear oil level bolt and gear oil drain bolt to drain the oil.
2) Using the gear oil bottle (optional part), inject oil through the drain bolt hole until it starts flowing out through the level bolt hole.
3) Reinstall and tighten the level and drain bolts securely.
4) Remove the oil bottle and reinstall the drain bolt.

Gear oil capacity	0.05ℓ (0.053 US qt)



Recommended oil	API standard (GL-4 or GL-5) SAE90 outboard motor gear oil



CAUTION:

If water is detected in the oil, check the gasket and water seal for damage and the gear case for improper installation.

3. SPARK PLUG

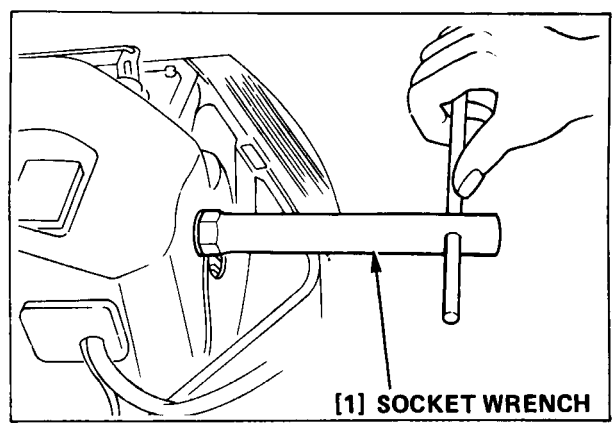
1) Remove the engine cover and spark plug cap.
   Remove the spark plug using the socket wrench.
2) Visually inspect the spark plug. Discard it if the insulator is cracked or chipped.

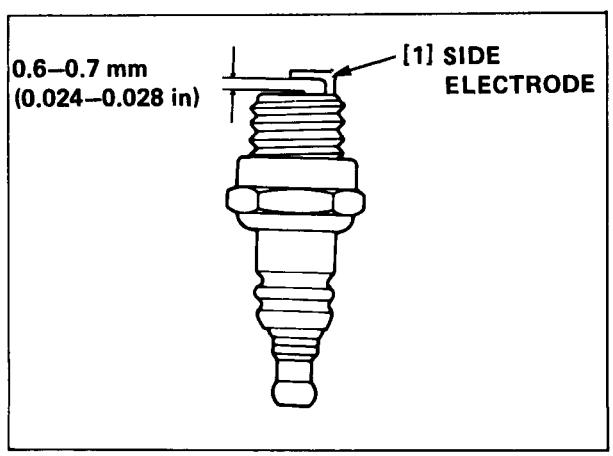
Standard spark plug	BF20: BMR-4A (NGK) BF2A: BMR-4A (NGK), W14MR-U (ND)

3) Remove carbon or other deposit with a stiff wire brush.
4) Measure the plug gap with a wire type feeler gauge.

Spark plug gap	0.6–0.7 mm (0.024–0.028 in)

If necessary, adjust the gap by bending the side electrode.
Make sure the sealing washer is in good condition, replace if necessary.
Install the plug fingertight to seat the washer, then tighten with a plug wrench (an additional 1/2 turn if a new plug) to compress the sealing washer. If you are reusing a plug, tighten 1/8–1/4 turn after the plug seats.





CAUTION:

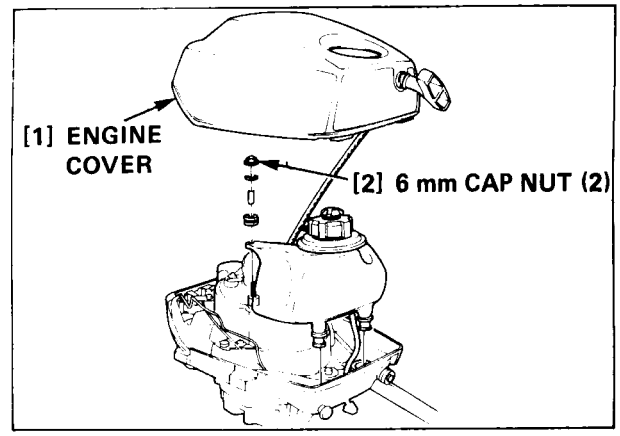
- **The spark plug must be securely tightened. An improperly tightened plug can become very hot and possibly damage the engine.**
- **Never use a spark plug with an improper heat range.**

4. COMBUSTION CHAMBER

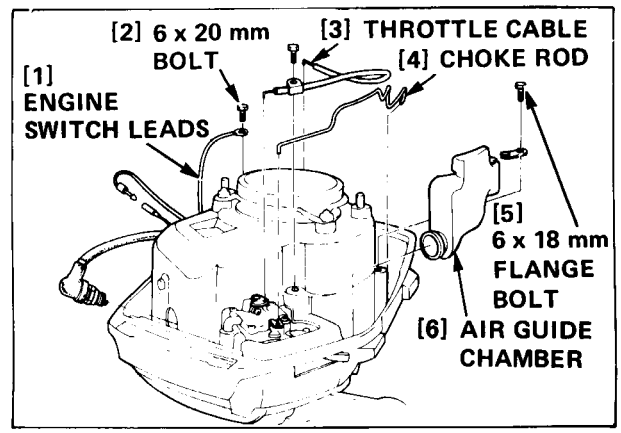
⚠ WARNING

- **Gasoline is flammable and is explosive under certain conditions. Do not smoke or allow flames or sparks near the outboard motor while draining fuel.**
- **Always work in a well-ventilated area.**
- **Be sure to store drained fuel in a safe container.**
- **Be careful not to spill fuel. Fuel vapor or spilled fuel may ignite; Wipe up any spilled fuel immediately, and make sure the area is dry before starting the engine.**

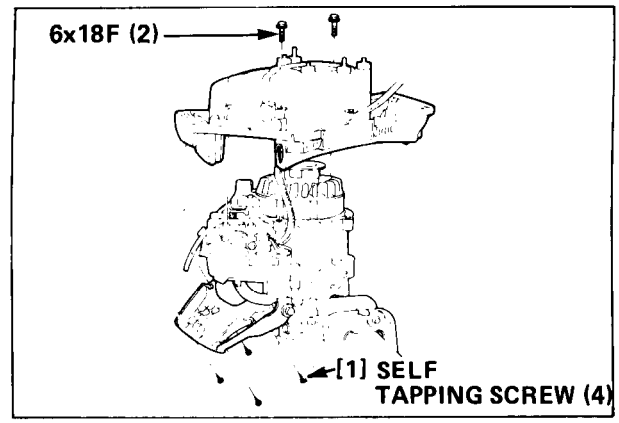
1) Remove the engine cover, recoil starter, two 6 mm cap nuts, and fuel tank.



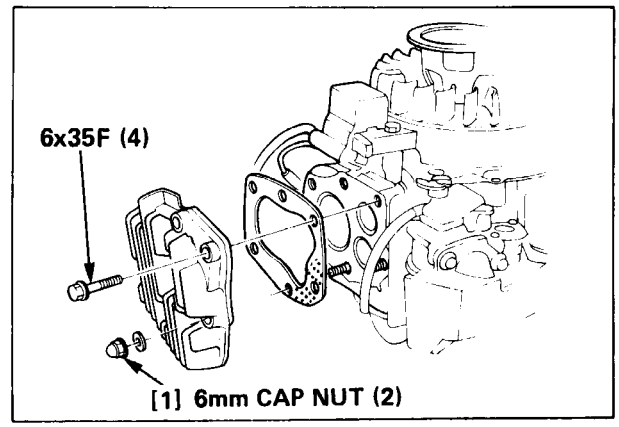
2) Remove the choke rod, throttle cable, 6 x 18 mm flange bolt, and air chamber. Disconnect the engine switch leads, spark plug cap and remove the 6 x 20 mm bolt. Remove the spark plug and fan cover grommet.



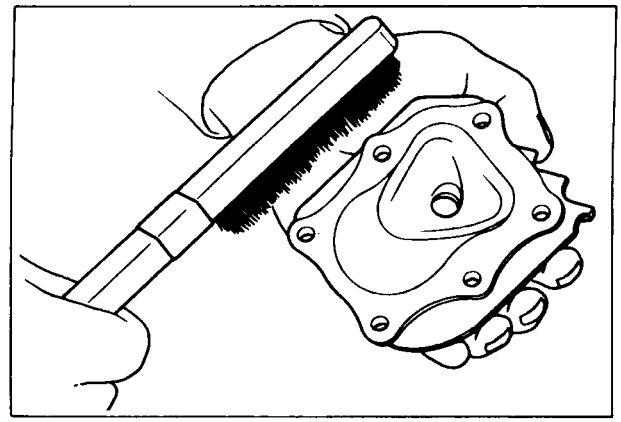
3) Remove the four 5 mm tapping screws, two 6x18 mm flange bolts, and fan cover.



4) Remove the four 6x35 mm flange bolts, two 6 mm cap nuts, and cylinder head.



5) Clean the cylinder head using a wire brush.



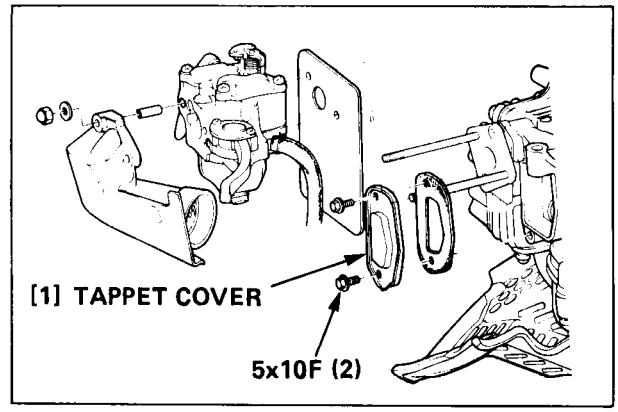
CAUTION

Be careful not to damage the cylinder head gasket surface.

6) Inspect cylinder head for warpage.

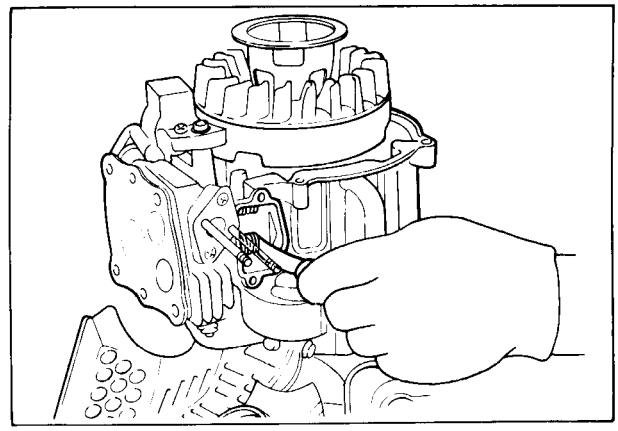
5. VALVE CLEARANCE

1) Remove the fan cover.
2) Remove the two 6 mm cap nuts and the carburetor.
3) Remove the two 5x10 mm flange bolts and the tappet cover.



4) With the engine cold and the piston at TDC on its compression stroke, measure the valve clearance.

Standard valve clearance IN/EX	0.08–0.16 mm (0.003–0.006 in)

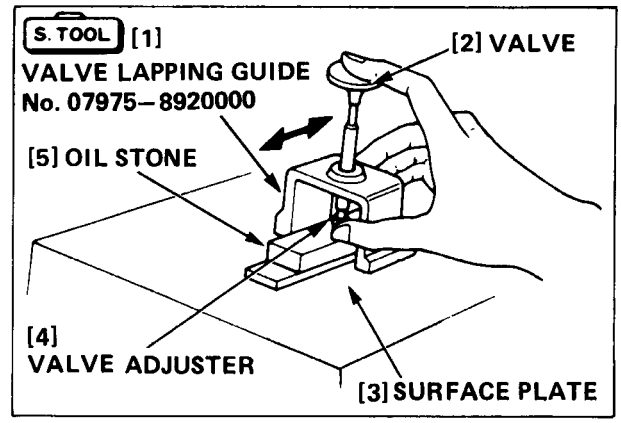


5) If the valve clearance is not within the specified range, replace the valve adjuster to obtain the correct clearance.
Valve adjusters are available in the sizes shown in the following table.
Measure the thickness of the used adjuster, and then select the replacement adjuster that will achieve the correct clearance.

REPLACEMENT VALVE ADJUSTER

Part No.	Thickness
14801–892–000	3.15 mm (0.124 in)
14803–892–000	3.25 mm (0.128 in)
14806–892–000	3.34 mm (0.132 in)
14809–892–000	3.43 mm (0.135 in)
14812–892–000	3.52 mm (0.139 in)
14815–892–000	3.61 mm (0.142 in)
14818–892–000	3.72 mm (0.146 in)
14820–892–000	3.82 mm (0.150 in)

If the standard clearance cannot be obtained by replacement, lap the bottom of the adjuster on an oil stone using the valve and the VALVE LAPPING GUIDE (special tool), as shown.



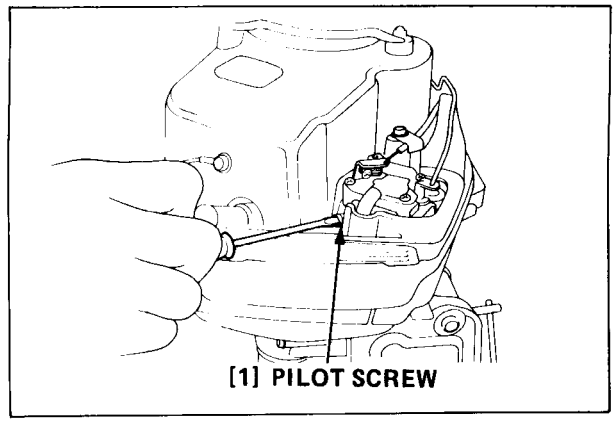
6. CARBURETOR

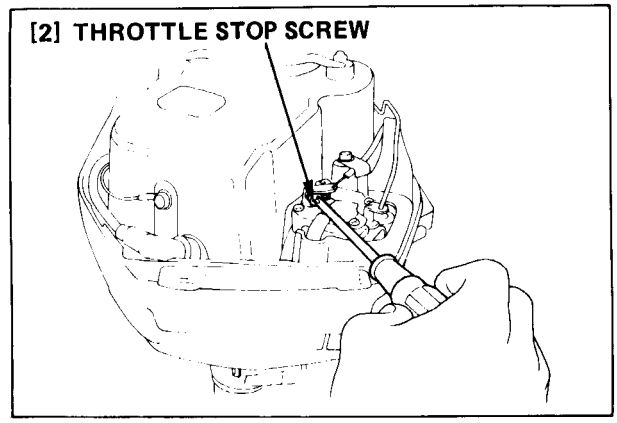
1) Start the engine and allow it to warm up to normal operating temperature.
2) With the engine idling, turn the pilot screw in or out to the setting that produces the highest idle rpm. The correct setting will usually be obtained at approximately the following number of turns out from the fully closed (lightly seated) position:

Pilot screw opening	BF20S: 2 turns (Engine serial number 1000001–1007046) 1-3/4 turns (Engine serial number 1007047 and subsequent) BF20L, BF2A: 2-1/8 turns

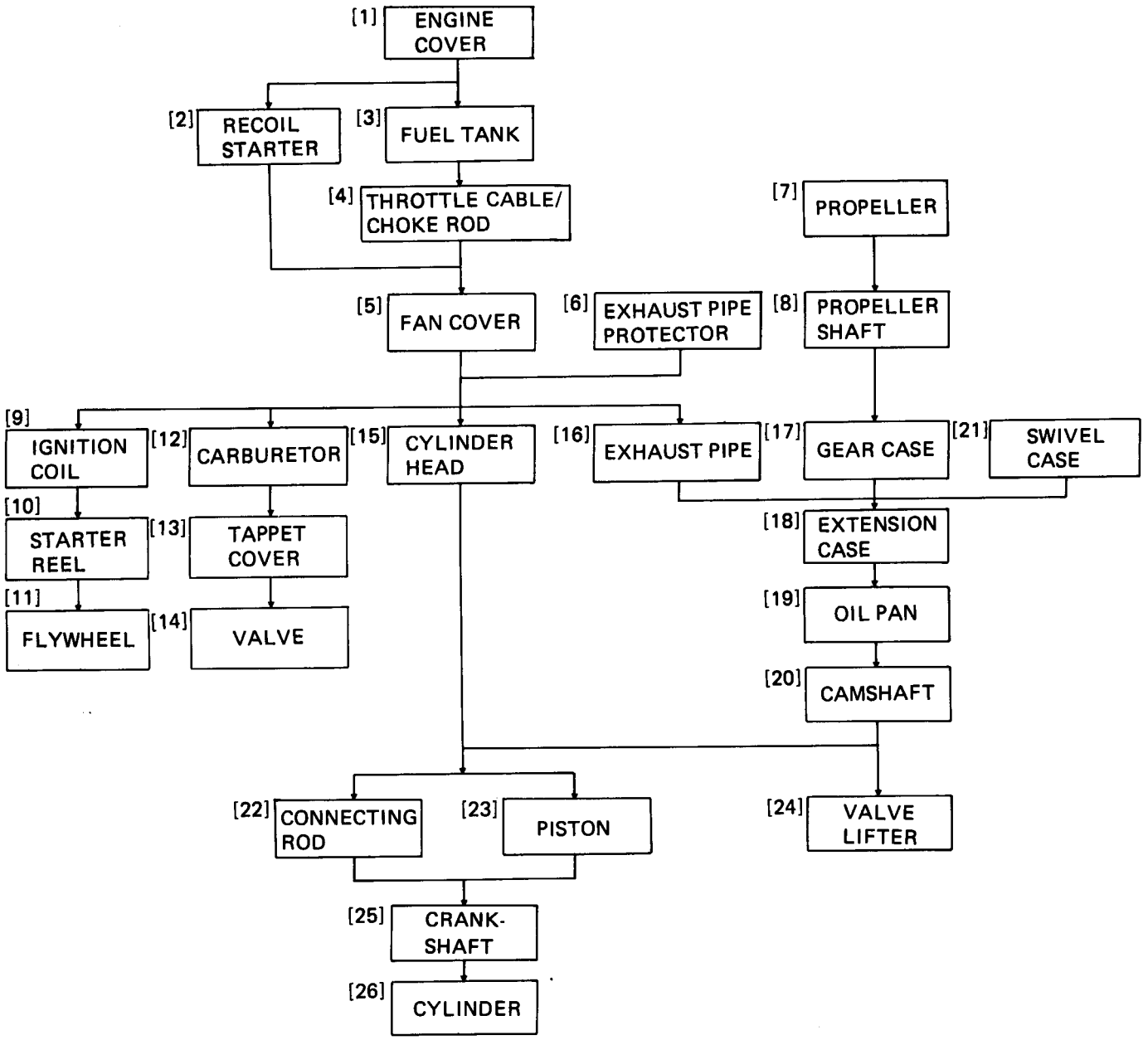
3) After the pilot screw is correctly adjusted, attach a tachometer to the engine and turn the throttle stop screw to obtain the standard idle speed.

Standard idle speed	1,400 ± 100 min^{-1} (rpm)

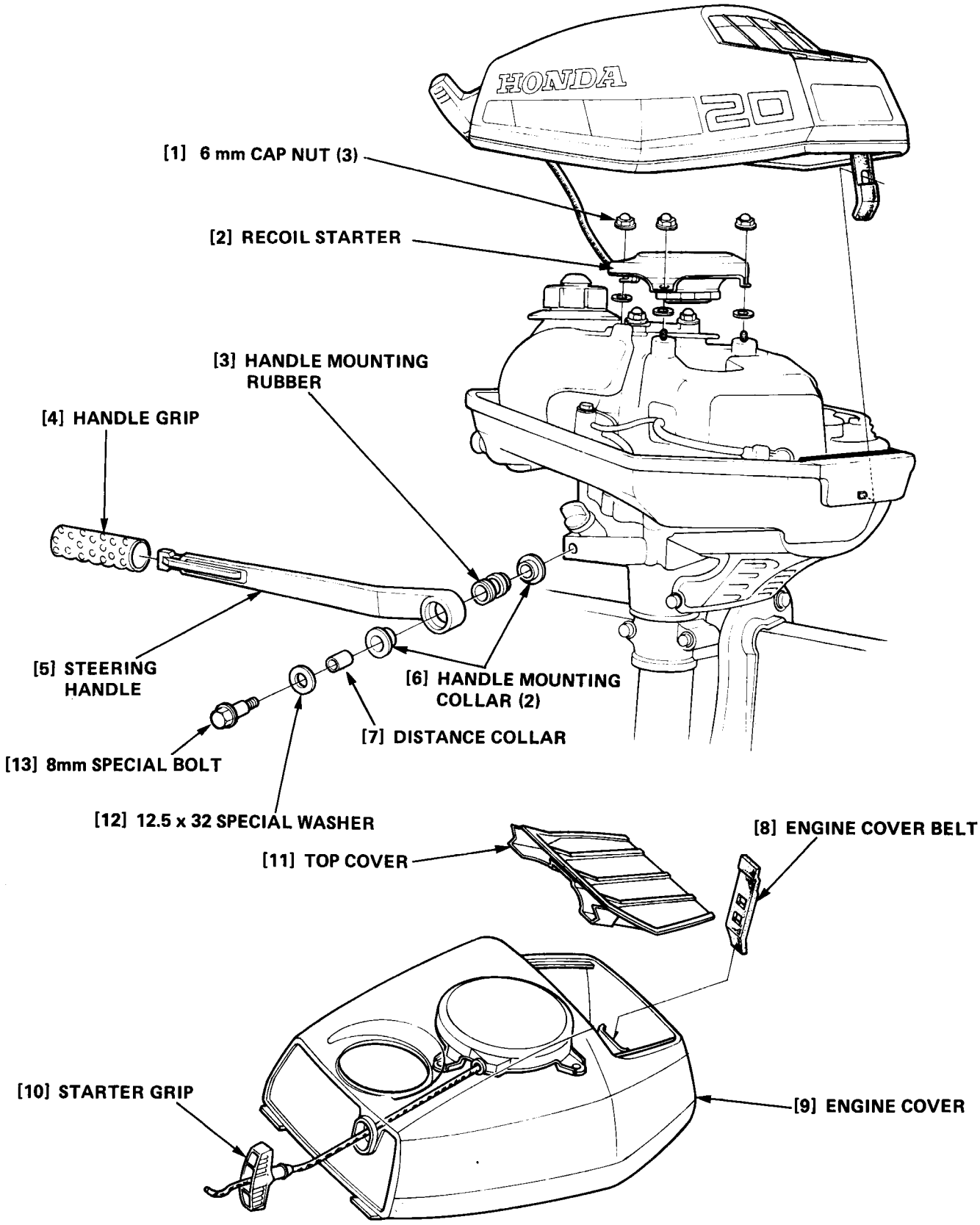

[1] PILOT SCREW



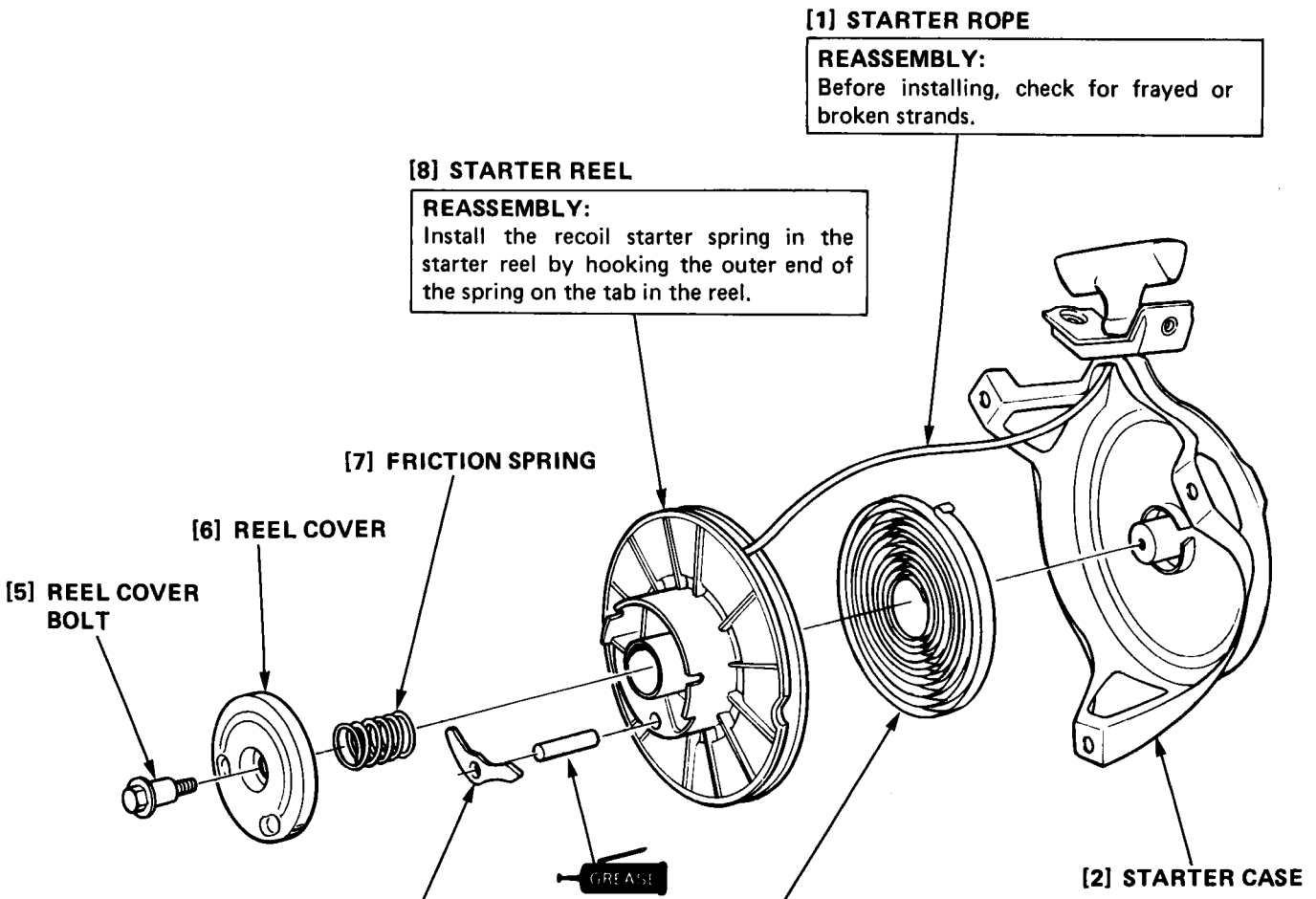
1. DISASSEMBLY CHART



2. ENGINE COVER/RECOIL STARTER/STEERING HANDLE



• RECOIL STARTER



[3] RECOIL STARTER SPRING

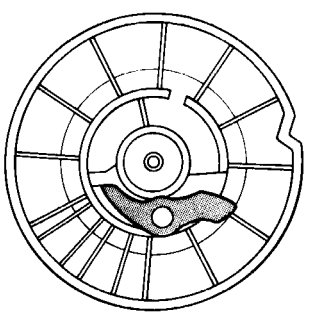
DISASSEMBLY:
Be careful not to allow spring to jump out.

INSTALLATION:
After installing in the starter reel, install the reel assembly in the starter case by hooking the inner end of the spring on the tab in the case.

CAUTION:
Wear heavy gloves to protect your hands from injury.

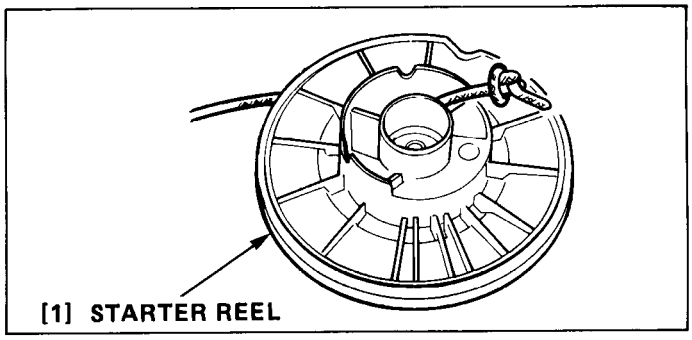
[4] RATCHET

REASSEMBLY:
- Check for wear or damage.
- Install as shown.



• ASSEMBLY OF RECOIL STARTER

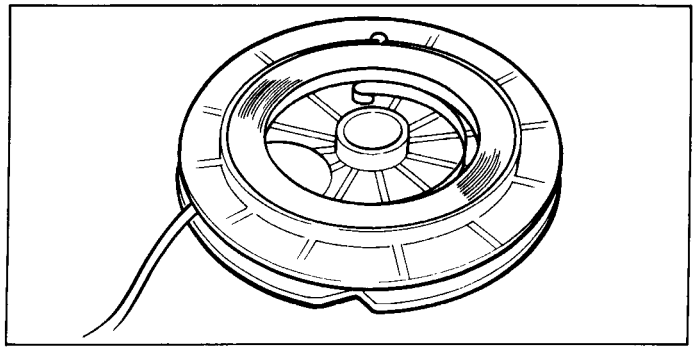
1) Pass the rope through the hole in the starter reel, and tie the end of the rope in a figure eight.
Next, wind the rope onto the reel in the indicated direction, and wedge the end of the rope in the notch on the edge of the reel.



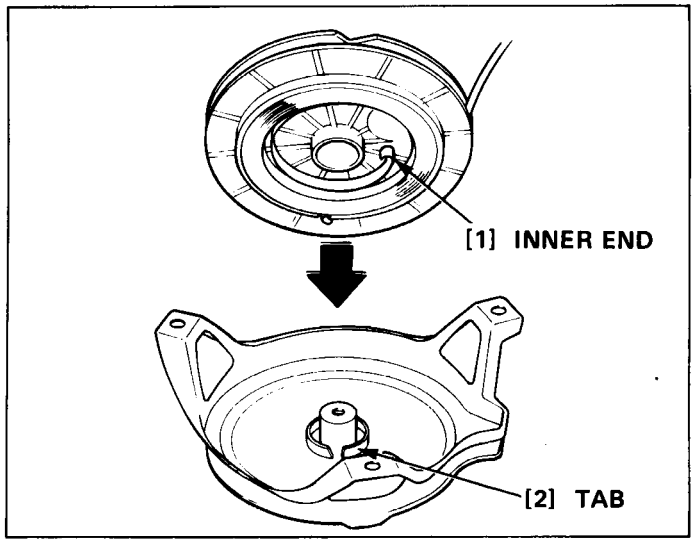
2) Hook the inner end of the spring on the tab in the reel and wind to the left.

CAUTION:

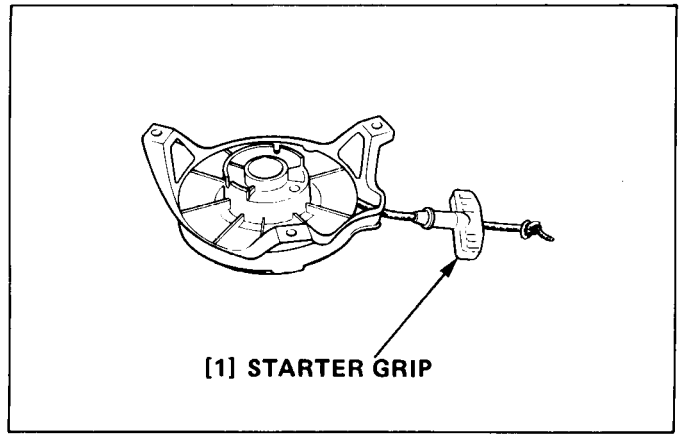
Take care that the spring does not fly out.



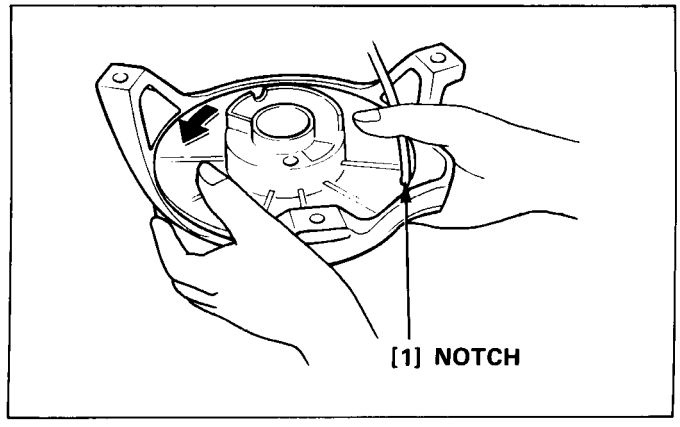
3) Install the starter reel assembly in the starter case.
Take care that the inner end of the spring is hooked on the tab in the case. (It is advisable to insert while turning to the left.)



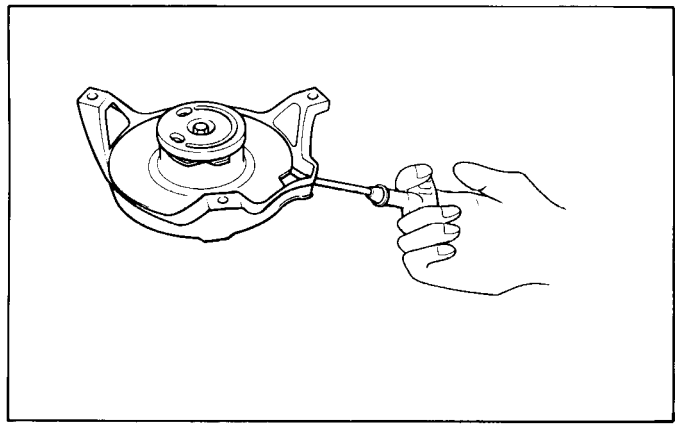
4) Hold the reel and pull the end of rope out of the case and feed it through the starter grip. Knot the end as shown.



5) With a length of rope extending from starter reel notch, rotate the reel 2 full turns in the direction of the arrow.



6) Attach the ratchet and the friction spring, mount the reel cover, tighten the reel cover bolt.
Pull the starter grip several times and check that the ratchet is operating properly.



3. FUEL TANK

⚠ WARNING

- **Gasoline is flammable and is explosive under certain conditions. Do not smoke or allow flames or sparks near the outboard motor while draining fuel.**
- **Always work in a well-ventilated area.**
- **Be sure to store drained fuel in a safe container.**
- **Be careful not to spill fuel. Spilled fuel or fuel vapor may ignite. If any fuel is spilled, make sure the area is dry before starting the engine.**

[1] BREATHER VALVE

REASSEMBLY:
Hand-tighten fully into the fuel cap body.

[2] BREATHER VALVE GASKET

[3] FUEL CAP BODY

[4] FUEL CAP SPRING

[5] FUEL CAP LINK

REASSEMBLY:
After threading the breather valve into the fuel cap body, install parts; secure with the 4 mm lock pin.

[18] FUEL CAP GASKET

[17] FUEL CAP BREATHER SPONGE

[16] FUEL CAP INNER

[6] 6 mm CAP NUT

[8] 6 mm PLAIN WASHER

[15] 4 mm PLAIN WASHER

[14] 4 mm LOCK PIN

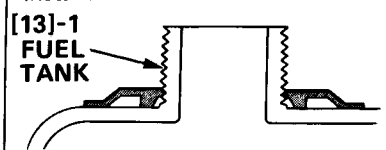
[7] COLLAR

[9] FUEL TANK MOUNTING RUBBER B (2)

REASSEMBLY:
Press into place in the fuel tank with the end of a screwdriver.

[13] TANK MOUNTING RUBBER A

REASSEMBLY:
Slip onto the filler neck until it bottoms against the tank, noting the installation direction.



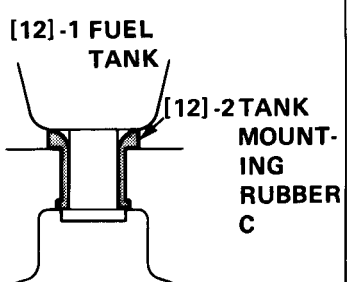
[10] FUEL TANK

DISASSEMBLY:
Be sure to the drain fuel from the tank before disassembling.

REASSEMBLY:
Remove all accumulated water and sediment before installing.

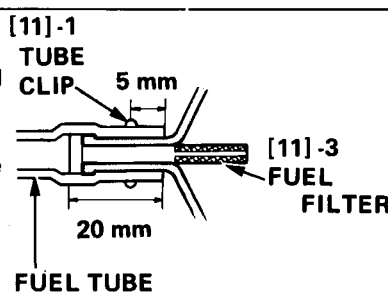
[12] TANK MOUNTING RUBBER C (2)

REASSEMBLY:
Press into the fan cover with the wide end facing up.

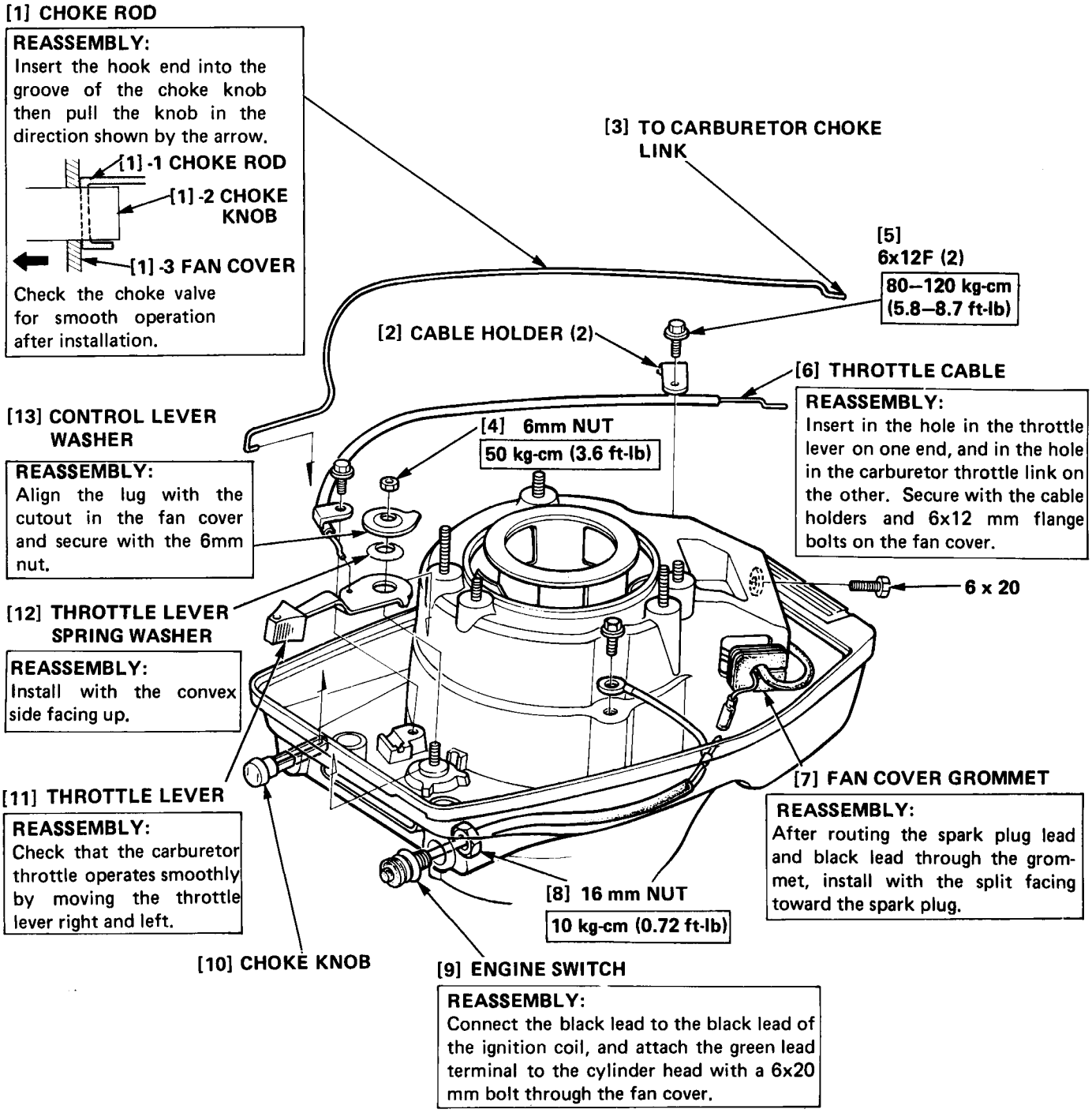


[11] FUEL FILTER

REASSEMBLY:
Check to be sure the filter is clean and undamaged.
Insert the filter into the fuel tank.
Place the tube clip about 5mm from the tube end.
Push the tube onto the fuel tank.



4. THROTTLE CABLE/CHOKE ROD

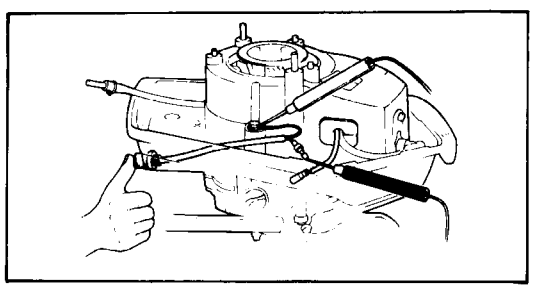


b. INSPECTION

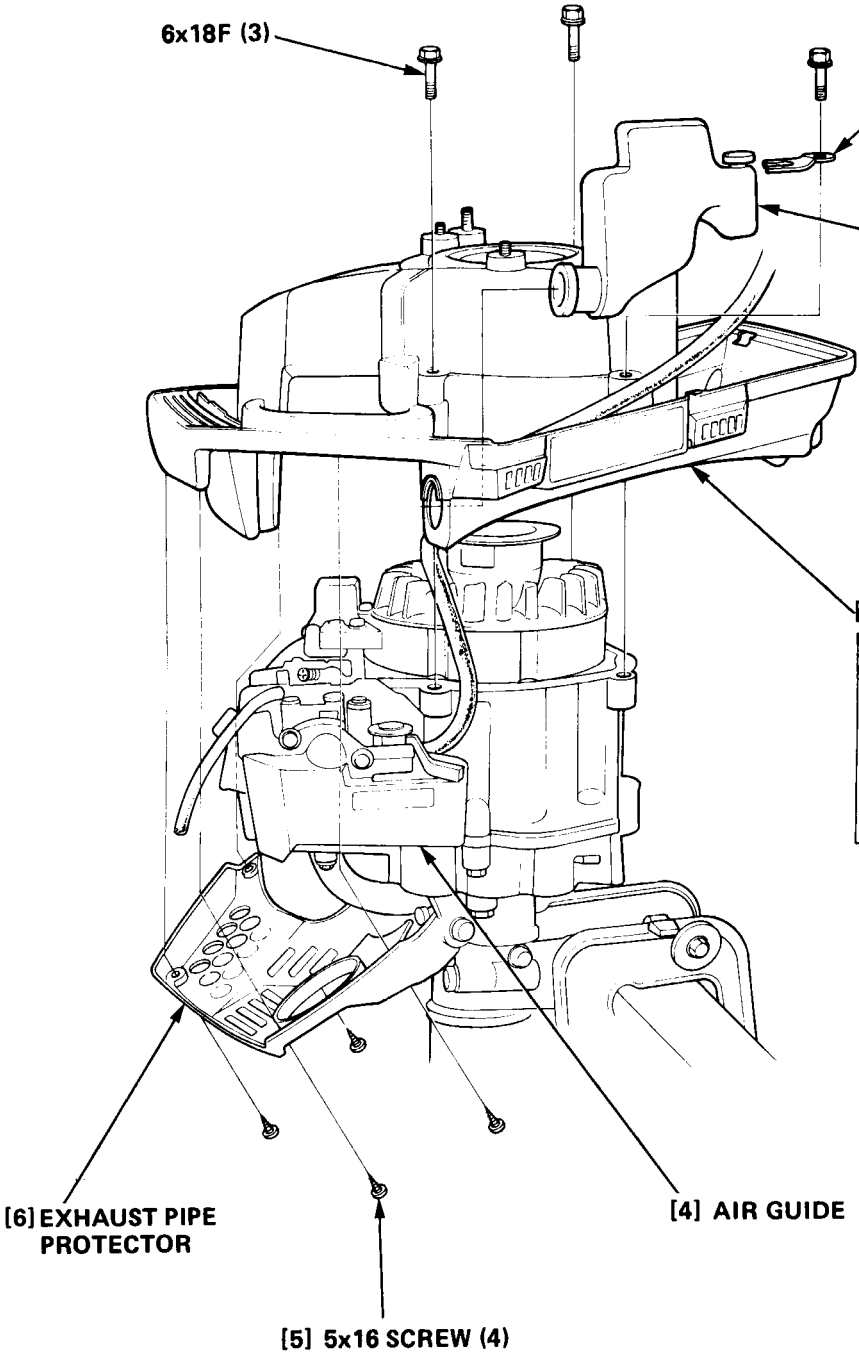
- ENGINE SWITCH

Check for continuity between the black and green lead:

Engine switch	Continuity
Press	There should be continuity
Release	There should be no continuity.

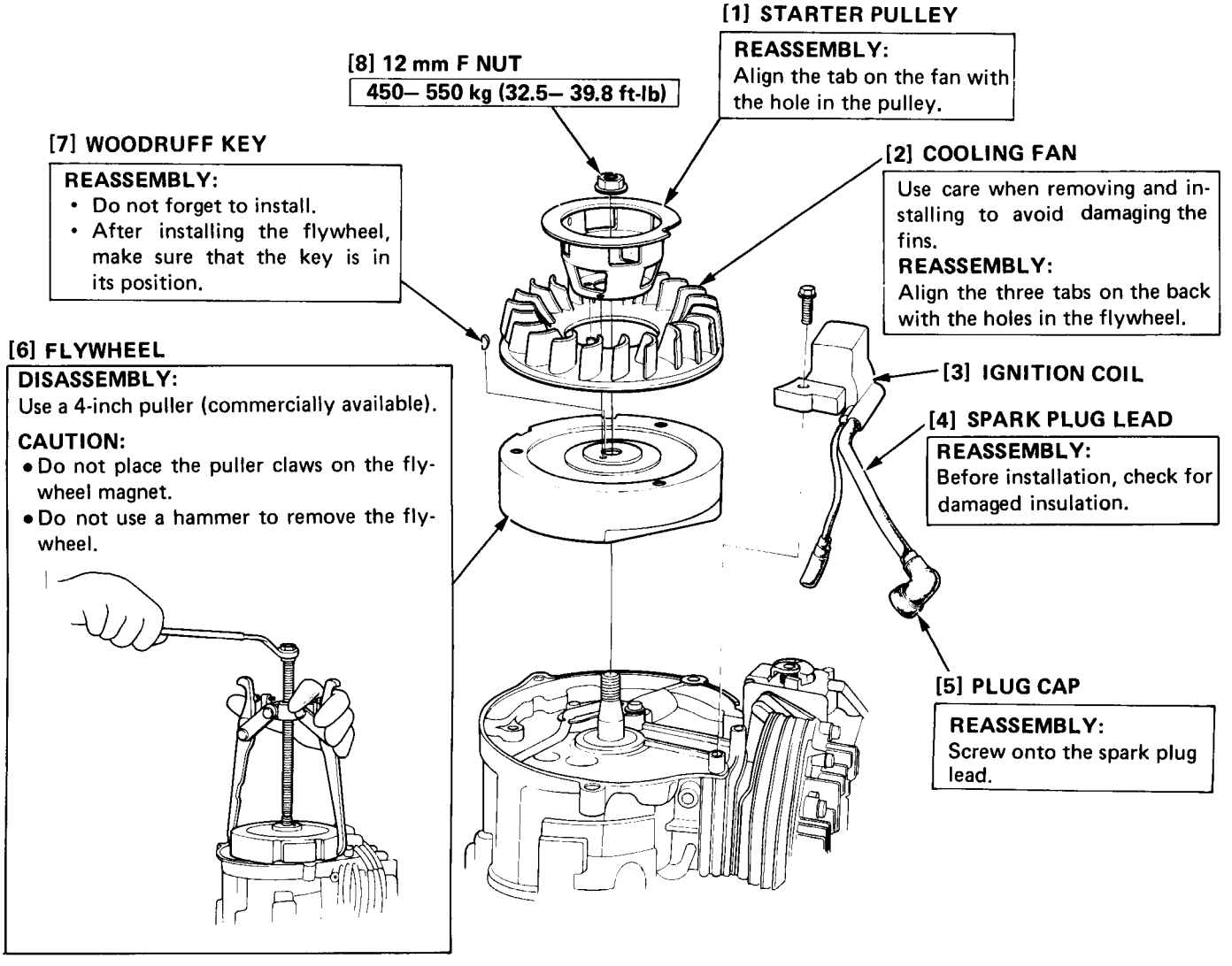


5. FAN COVER/EXHAUST PIPE PROTECTOR



6. FLYWHEEL/IGNITION COIL

a. DISASSEMBLY/REASSEMBLY



• IGNITION COIL

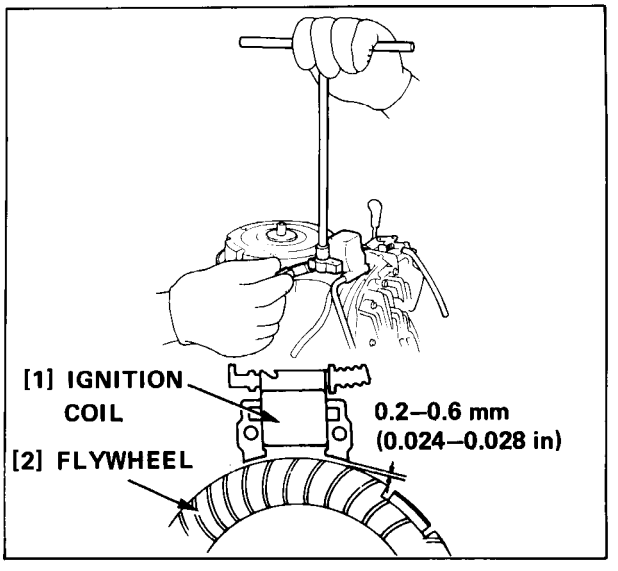
1) Insert a long thickness gauge between the ignition coil and flywheel.

Specified clearance	0.2–0.6 mm (0.008–0.024 in)

NOTE:

- The clearance at both ends of the coil must be adjusted simultaneously. If a long thickness gauge is not available, use separate thickness gauges at each end, or use a strip of post card of the proper thickness.
- Avoid the magnet area of the flywheel when adjusting the clearance.

2) Tighten the ignition coil bolts while holding the coil firmly against the flywheel.



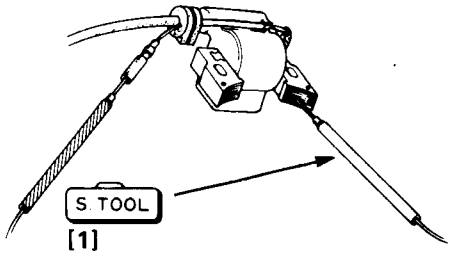
b. INSPECTION

• TRANSISTORIZED IGNITION COIL

< Primary side >

Measure the resistance of the primary coil by attaching one ohmmeter lead to the ignition coil's primary (black) lead while touching the other test lead to the iron core.

Primary side resistance value	0.7 – 0.9 Ω

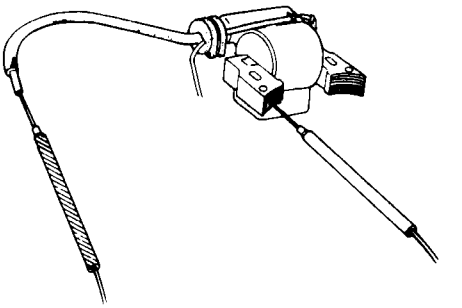


[1]
ANALOG VOLT-OHMMETER
NO. KS–TH–5H–1
or
DIGITAL VOLT-OHMMETER
NO. KS–AH–32–003

< Secondary side >

Measure the resistance of the secondary side of the coil by removing the spark plug cap and touching one test lead to the spark plug lead wire while touching the other lead to the coil's iron core.

Secondary side resistance value	6.3– 7.7 kΩ

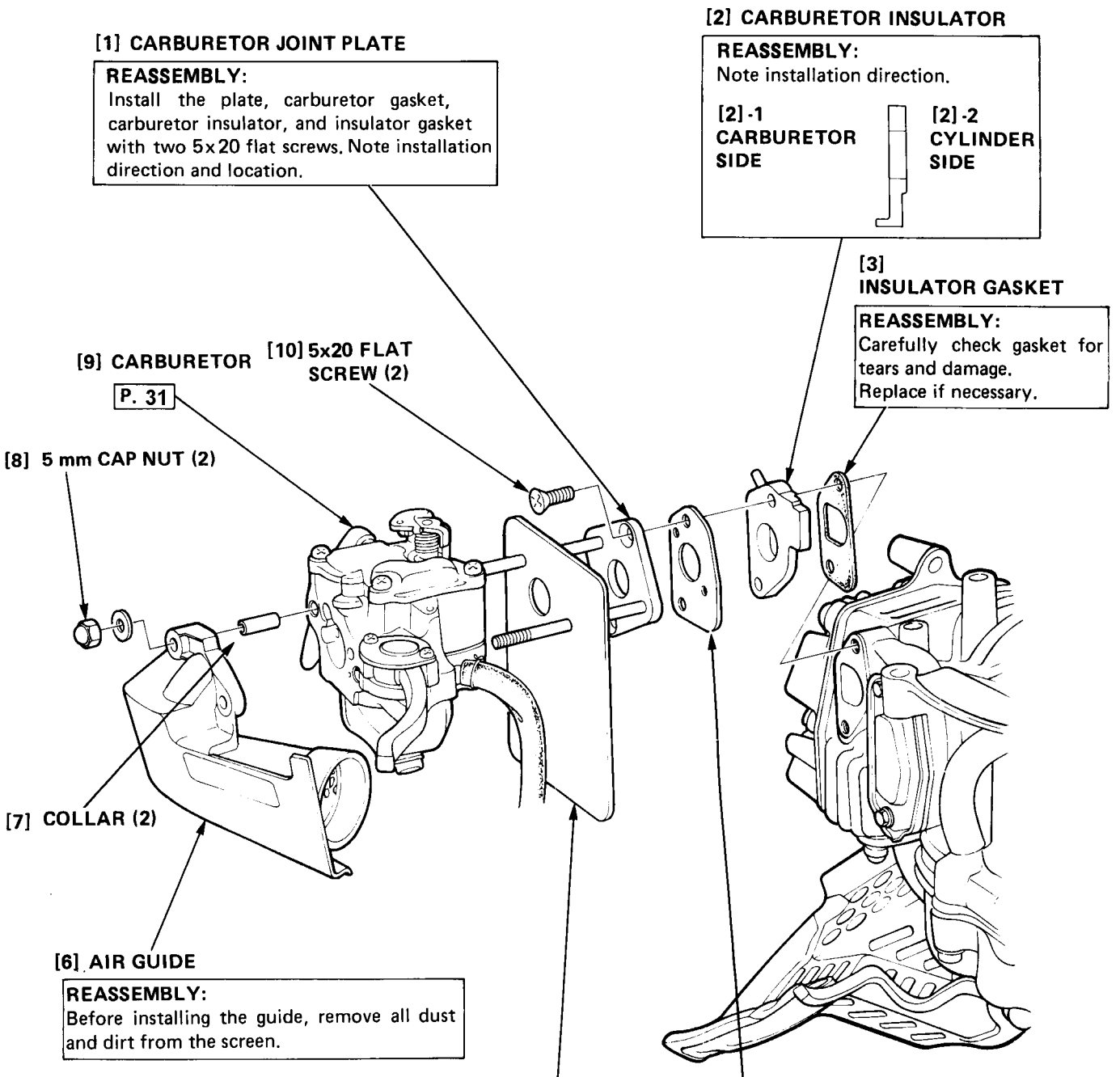


NOTE:

- A false reading will result if the spark plug cap is not removed.
- For a dynamic test, refer to the troubleshooting procedure on page 13

7. CARBURETOR

a. DISASSEMBLY/REASSEMBLY



• CARBURETOR

⚠ WARNING

Remove the set bolt and drain the carburetor before disassembling. Fuel vapor or spilled fuelmay ignite. Wipe up spilled fuel at once.

4x12 (2)

3x6 (2)

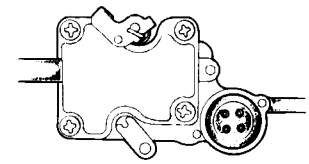
[1] LEVER SETTING PLATE

[2] COCK LEVER SPRING

[3] COCK LEVER

[4] FUEL COCK GASKET

REASSEMBLY:
Carefully check the gasket for wear and cracks.



[12] CARBURETOR BODY

REASSEMBLY:
Clean internal passages and orifices with compressed air before installing.

[11] MAIN NOZZLE

REASSEMBLY:
Clean thoroughly with compressed air before installing.

[5] FLOAT

REASSEMBLY:
Check for smooth movement after installing.

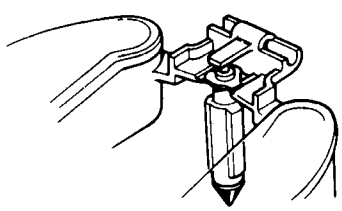
[13] FLOAT PIN

[6] MAIN JET

REASSEMBLY:
Clean thoroughly with compressed air before installing.

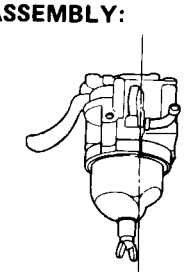
[10] FLOAT VALVE

REASSEMBLY:
Check for worn valve or weak spring. Replace if necessary.
Set the valve on the float arm properly as shown.



[7] FLOAT CHAMBER

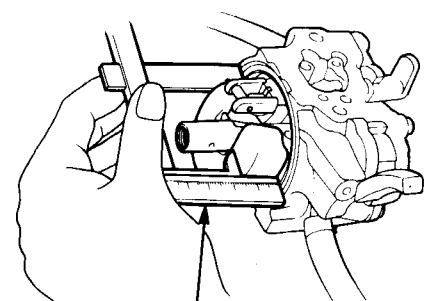
REASSEMBLY:



[9] SET BOLT

REASSEMBLY:
After assembly, check for any sign of fuel leakage.

[8] DRAIN SCREW



[1] FLOAT LEVEL GAUGE
No. 07401-0010000

b. INSPECTION

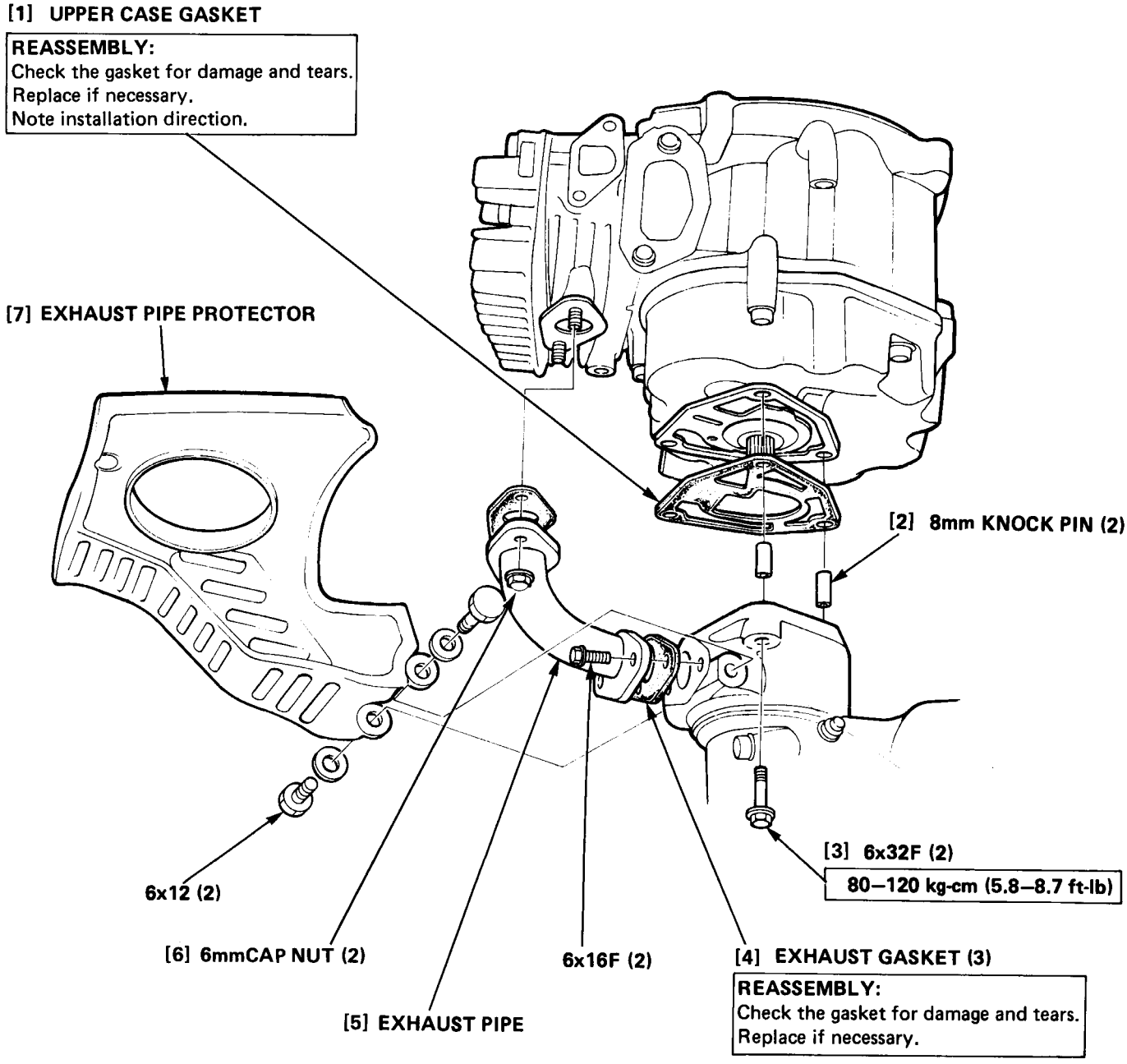
• FLOAT HEIGHT

Place the carburetor in an upright position, and measure the distance between the float top and carburetor body when the float just contacts the float valve.

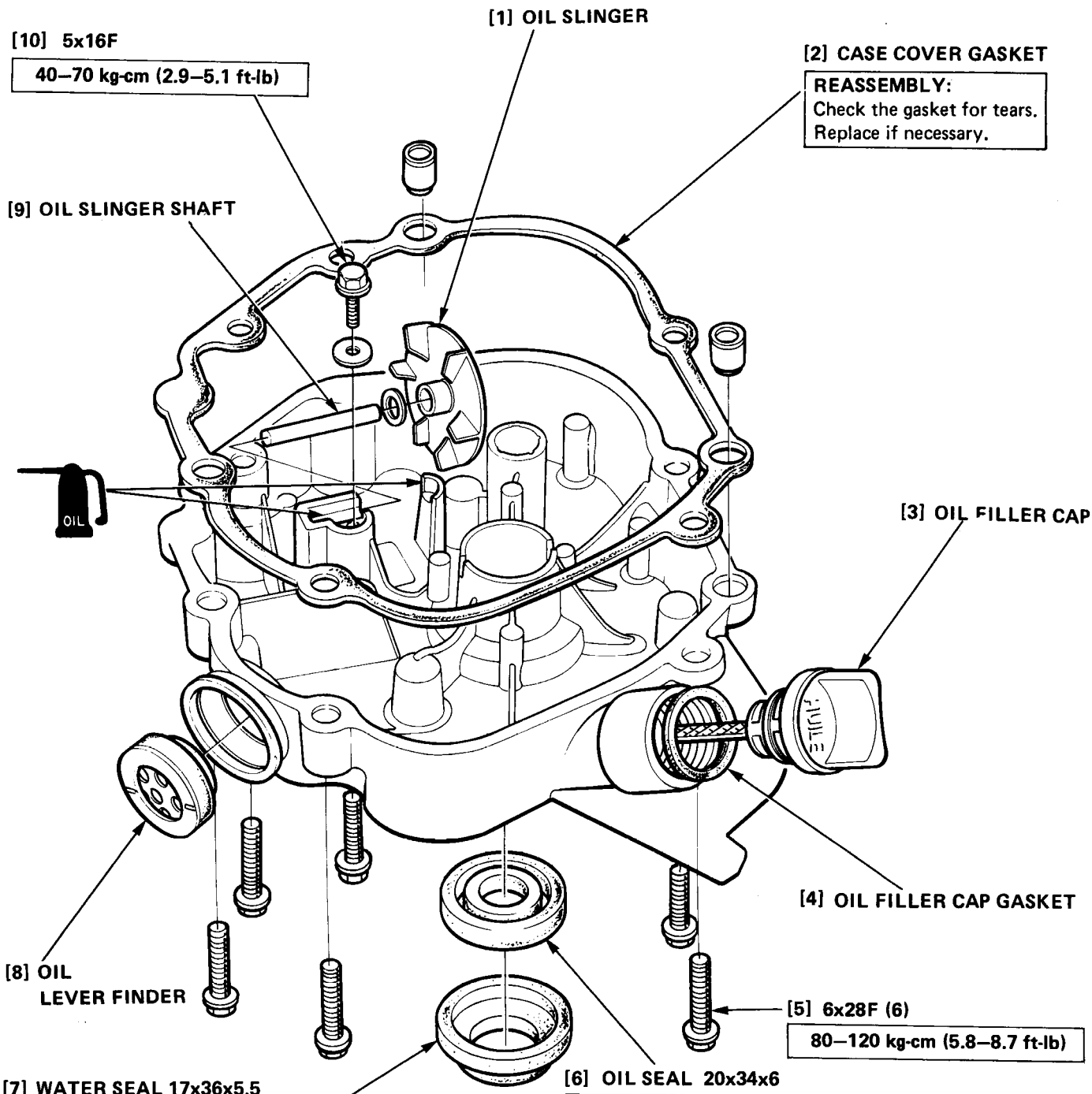
Standard float height	10.5–13.5 mm (0.413–0.531 in)

Float height cannot be adjusted. If the height is out of specification, replace the float or the valve.

8. ENGINE AND LOWER UNIT



9. OIL PAN



REASSEMBLY:
After installing the oil seal, use the special tools to drive a new water seal into the oil pan.

S. TOOL [7]-1 ATTACHMENT, 37 x 40 mm
No. 07746–0010200
PILOT, 17 mm
No. 07746–0040400
DRIVER
No. 07749–0010000

REASSEMBLY:
Install a new oil seal with the lettered side facing outward. Use the special tools to drive in the oil seal until its outer face is flush with the oil pan.

S. TOOL [6]-1 ATTACHMENT, 32 x 35 mm
No. 07746–0010100
PILOT, 20 mm
No. 07746–0040500
DRIVER
No. 07749–0010000

10. CYLINDER HEAD/VALVES

a. DISASSEMBLY/REASSEMBLY

See pages 35 and 36 for removal and installation of the valves and valve guides.

[1] SPARK PLUG

STANDARD PLUG:
BF20: BMR-4A (NGK)
BF2A: BMR-4A (NGK), W14MR-U (ND)
TIGHTENING TORQUE:
100–150 kg-cm (7.2–10.8 ft-lb)

[2] 6 mm CAP NUT (2)

80–120 kg-cm (5.8–8.7 ft-lb)

[3] 6 x 35 F (4)

80–120 kg-cm (5.8–8.7 ft-lb)

[4] EXHAUST VALVE

REASSEMBLY:
Check for damage or carbon build-up.

[5] INTAKE VALVE

Do not confuse with the exhaust valves. The intake valve is larger than the exhaust valve.

[6] VALVE SPRING

[7] SPRING RETAINER

DISASSEMBLY:
Slide the retainer sideways to align the large hole with the valve stem.

[8] TAPPET ADJUSTER

REASSEMBLY:
To install, lift the valve using the special tool (Page 34).

[9] TAPPET COVER

[10] 5 x 10 F (2)

40–70 kg-cm (2.9–5.1 ft-lb)

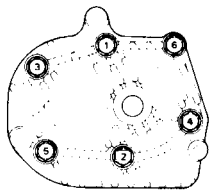
[11] TAPPET COVER GASKET

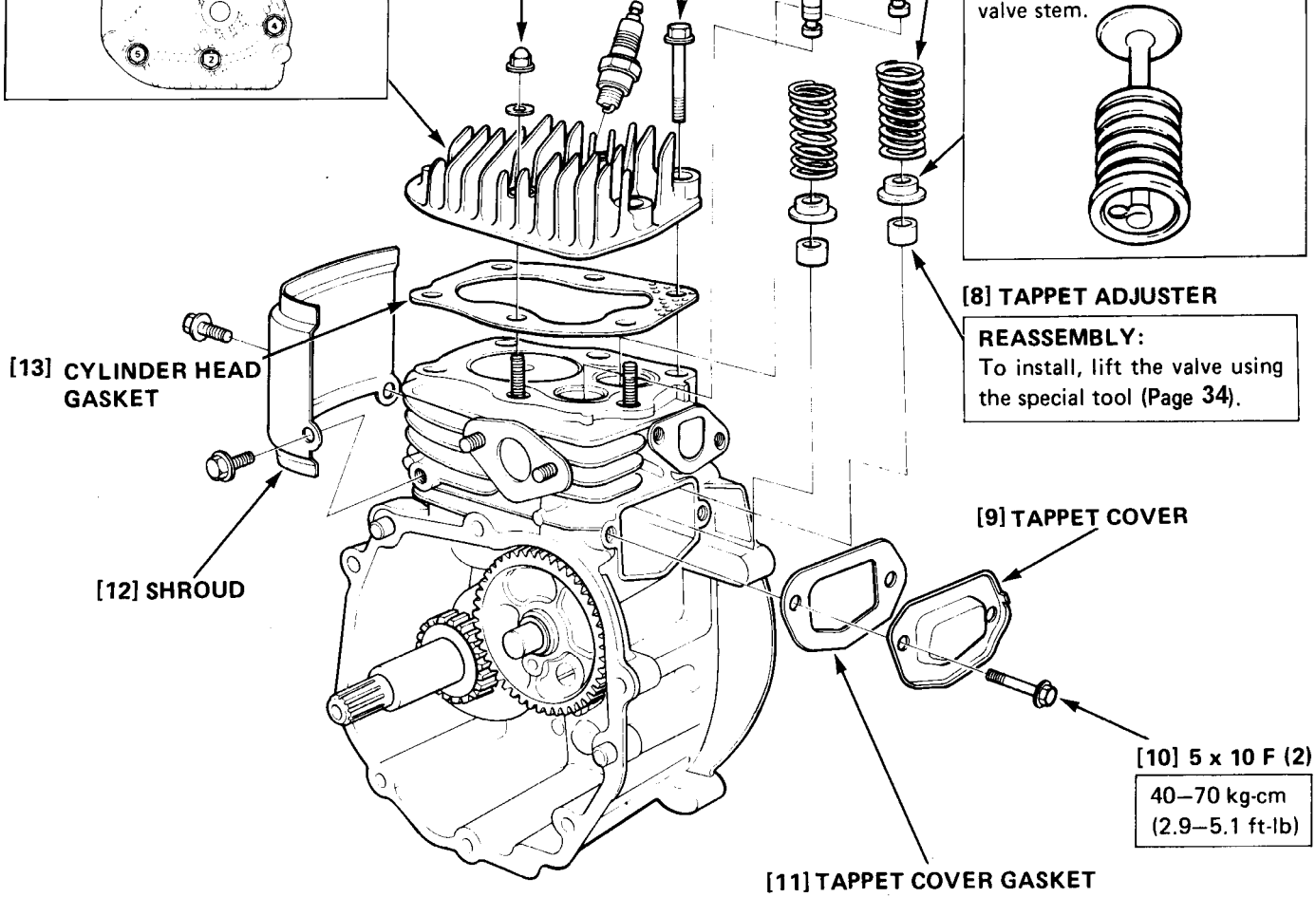
[12] SHROUD

[13] CYLINDER HEAD GASKET

[14] CYLINDER HEAD

REASSEMBLY:
- Remove accumulated carbon deposits from the combustion chamber before installation. Inspect the cylinder head for warpage.
- Loosen and tighten the bolts and nuts, in the order shown. After tightening, measure cylinder compression (Page 11).





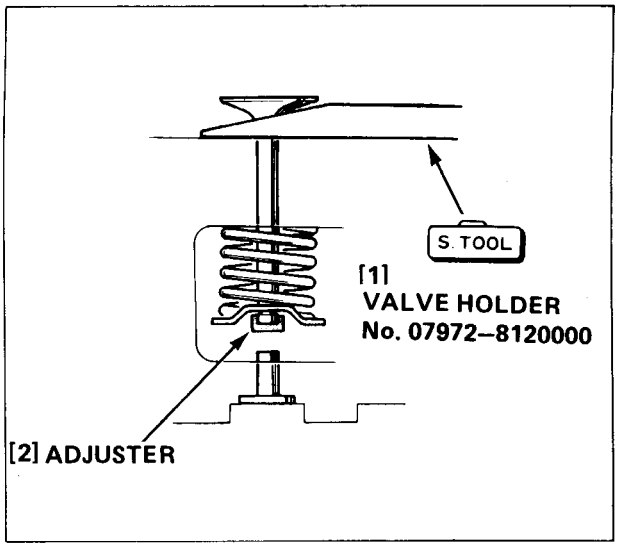
• VALVES

DISASSEMBLY:

1) Rotate the crankshaft until the valve is fully open, and then hold it open with the special tool.
2) Rotate the crankshaft back to lower the lifter, and then remove the adjuster. After removing the adjuster, remove the special tool.

NOTE:

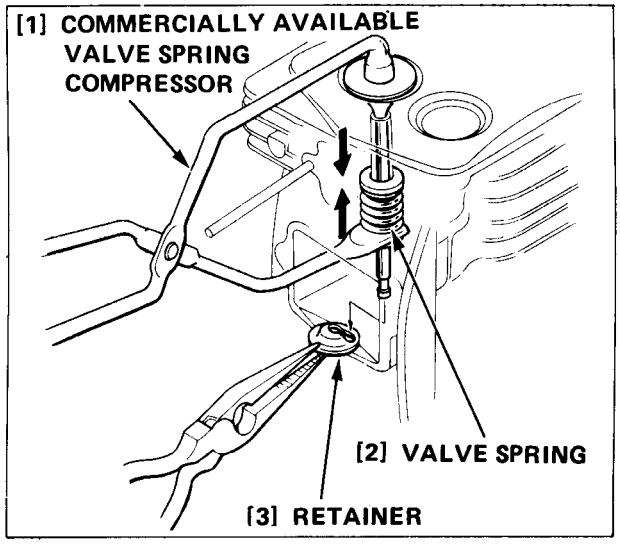
Keep the adjusters in order so they can be reinstalled in their original locations.



3) Compress the springs with a commercially available VALVE SPRING COMPRESSOR and remove the spring retainers.

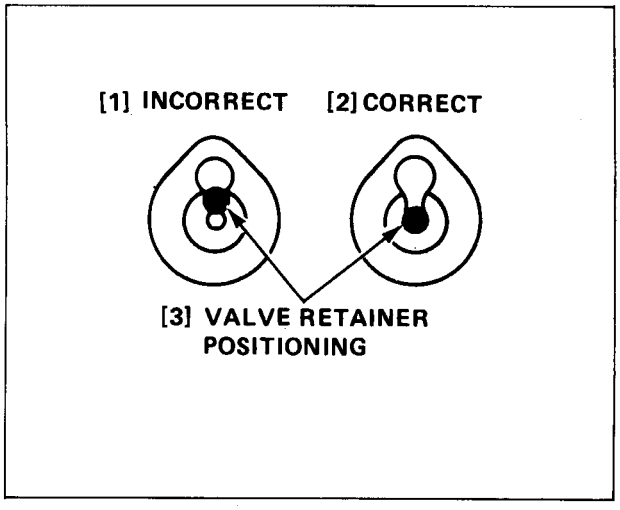
CAUTION:

Do not overtighten the compressor, or you may damage the valve spring.



REASSEMBLY:

1) Slide the valves into the valve guides and install springs on the stems. Install the spring retainers by compressing the springs.
   Be sure to set the valve stem into the small hole in the center of the retainer.
2) Install the adjusters using a VALVE HOLDER as in DISASSEMBLY.
   After installing, check valve operation.



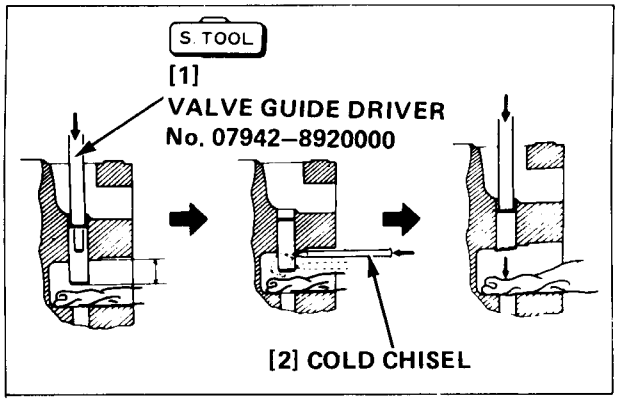
d. VALVE GUIDE REPLACEMENT

REMOVAL:

1) Place a shop towel in the space below the valve guide, and drive the valve guide down about 15 mm (a little over 1/2 inch).

CAUTION:

When driving the valve guides out, be careful not to damage the cylinder block.

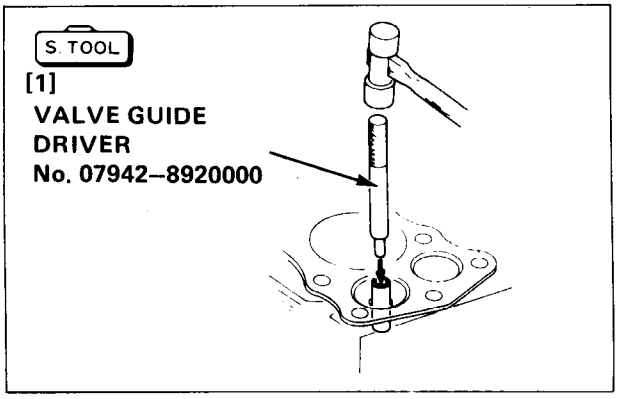


2) Using a hammer and chisel, score the valve guide at the point where it emerges, then strike the tip of the guide to break it off.

⚠ WARNING

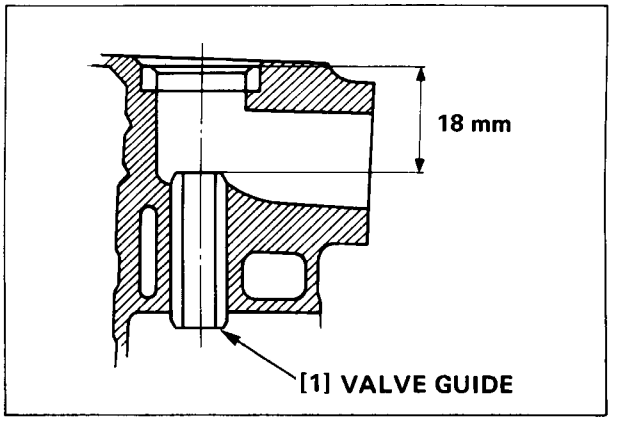
Wear adequare eye protection when breaking the valve guide.

3) Drive out the remainder of the valve guide. If necessary, repeat step 2 to gain additional clearance.



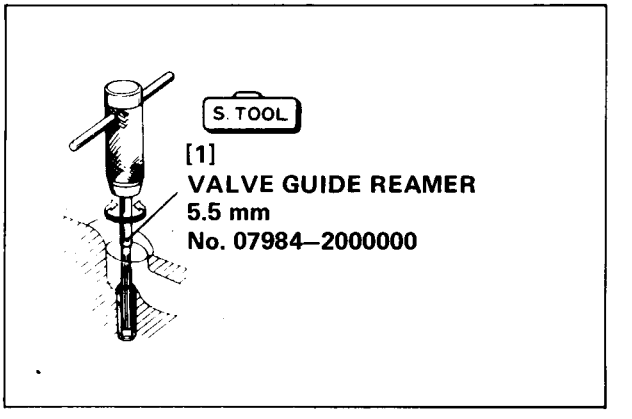
INSTALLATION:

1) Drive in the new guide to a seating depth of 18 mm (0.7 in).
2) After installation, inspect the valve guide for damage. Replace the guide if damaged.



• VALVE GUIDE REAMING

1) Coat the reamer and valve guide with cutting oil.
2) Rotate the reamer clockwise through the valve guide the full length of the reamer.
3) Continue to rotate the reamer clockwise while removing it from the valve guide.
4) Thoroughly clean the cylinder block to remove any cutting residue.
5) Check the valve guide bore; it should be straight, round and centered in the valve guide.
   Insert the valve and check operation. If the valve does not operate smoothly, the guide may have been bent during installation. Replace the valve guide if it is bent or damaged.
6) Check the Valve Guide-to-Stem Clearance (P. 37).



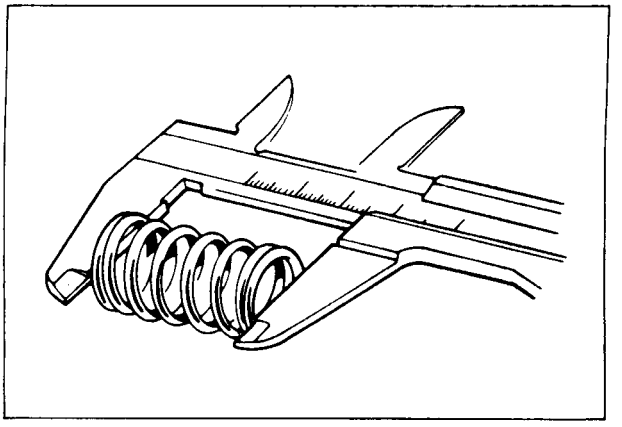
c. INSPECTION

• VALVE SPRING FREE LENGTH

Measure the free length of the valve springs

STANDARD	SERVICE LIMIT
27.1 mm (1.07 in)	25.0 mm (0.98 in)

Replace the springs if they are shorter than the service limit.



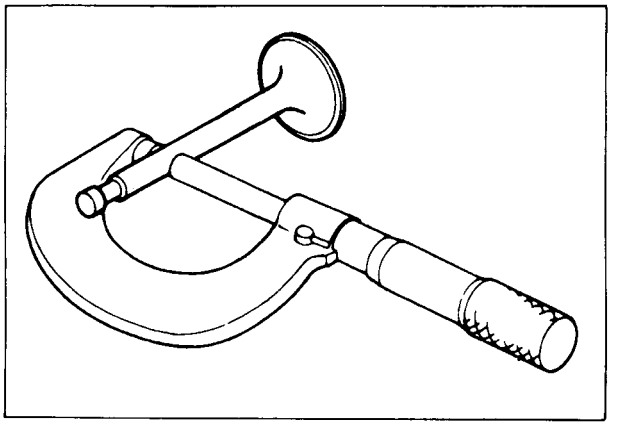
• VALVE STEM O.D.

Inspect each valve for face irregularities, bending or abnormal stem wear. Replace the valve if necessary.

Measure and record each valve stem O.D.

	STANDARD	SERVICE LIMIT
IN	5.490 mm (0.216 in)	5.45 mm (0.215 in)
EX	5.445 mm (0.214 in)	5.40 mm (0.213 in)

Replace the valves if their O.D. is smaller than the service limit.



• VALVE GUIDE I.D.

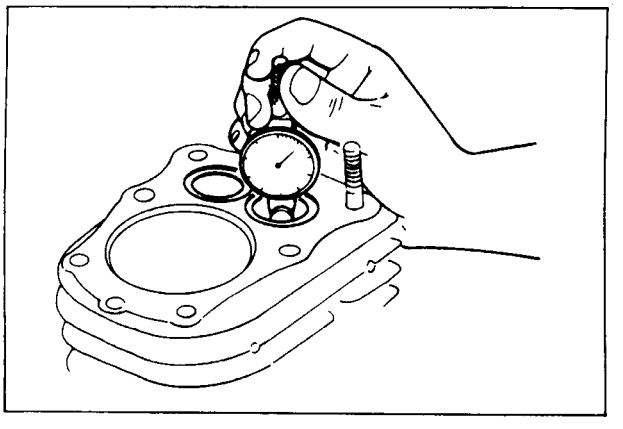
NOTE:

Ream the valve guides to remove any carbon deposits before measuring.

Measure and record each valve guide I.D.

STANDARD	SERVICE LIMIT
5.5 mm (0.217 in)	5.56 mm (0.219 in)

Replace the guides if they are over the service limit.



• VALVE GUIDE-TO-STEM CLEARANCE

Subtract each valve stem O.D. from the corresponding guide I.D. to obtain the stem-to-guide clearance.

	STANDARD	SERVICE LIMIT
IN	0.010 mm (0.0004 in)	0.11 mm (0.004 in)
EX	0.055 mm (0.0022 in)	0.16 mm (0.006 in)

If the stem-to-guide clearance exceeds the service limit, determine if the new guide with standard dimensions would bring the clearance within tolerance. If so, replace any guide as necessary and ream to fit.

If the stem-to-guide clearance exceeds the service limit with new guides, replace the valves as well.

NOTE:

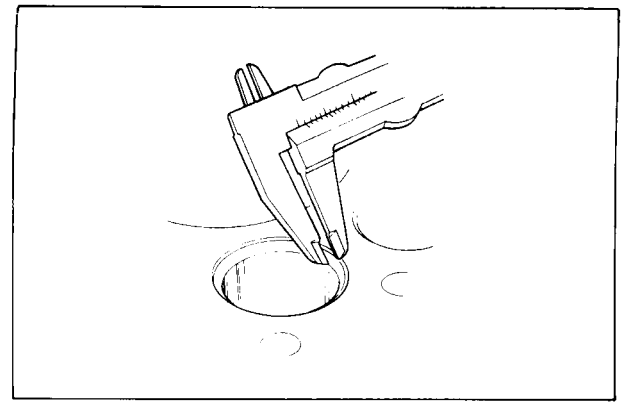
Recondition the valve seats whenever the valve guides are replaced.

• VALVE SEAT WIDTH

Measure the valve seat width.

STANDARD	SERVICE LIMIT
0.7 mm (0.028 in)	1.0 mm (0.04 in)

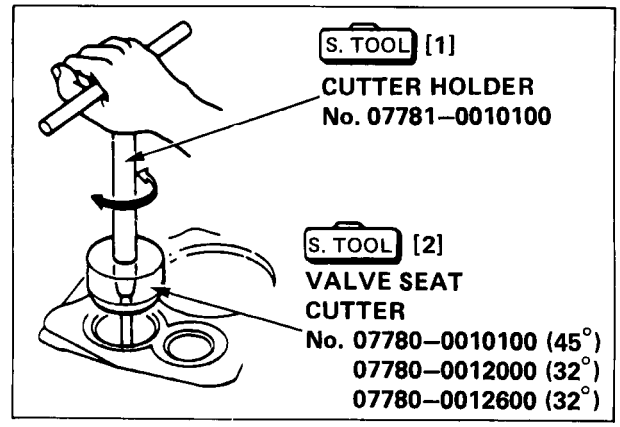
If the valve seat width is under the standard, or over the service limit, recondition the valve seat.



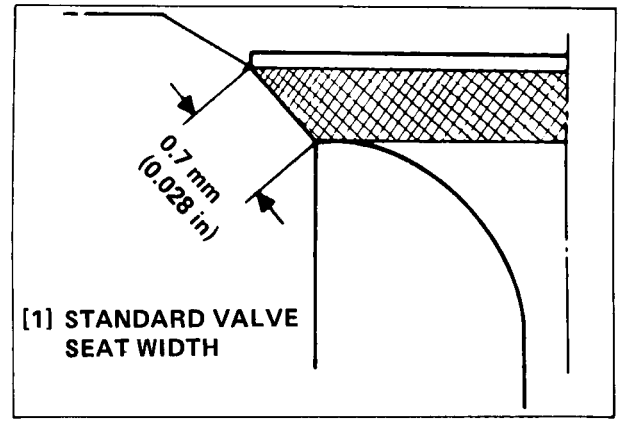
d. RECONDITIONING

• VALVE SEAT RECONDITIONING

1) Resurface the valve seat with a 45° seat cutter, removing only enough material to produce a smooth and concentric seat

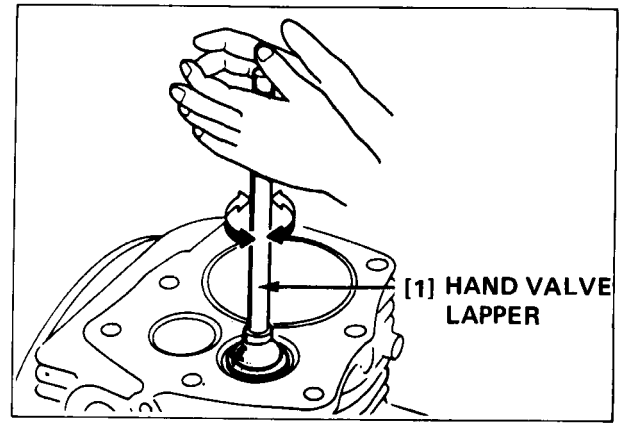


2) Use a 32° top cutter to narrow the seat to the standard width, then make a light pass with the 45° seat cutter to remove any possible burrs at the edge of the seat. The finished seat should have a width of 0.7 mm (0.028 in).
3) After resurfacing the seat, inspect for even valve seating. Apply Prussian blue compound to the valve face, insert the valve, then lift it and snap it closed against the seat several times. The valve seating surface, as shown by the Prussian blue compound, should show good contact all the way around.



• VALVE LAPPING

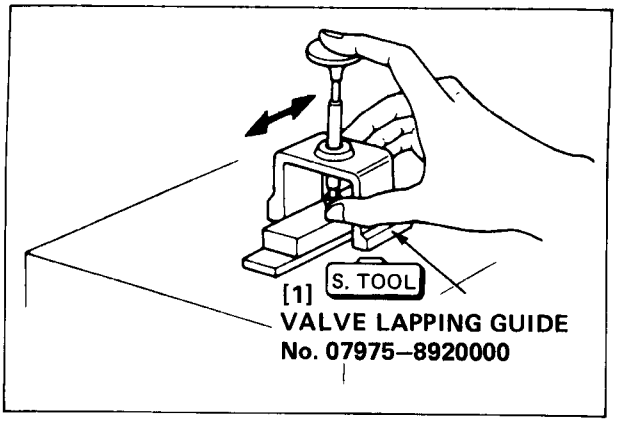
Lap the valves into their seats, using a hand valve lapper and lapping compound (commercially available).



• VALVE ADJUSTER LAPPING

If the standard valve clearance cannot be obtained by valve adjuster replacement (see p. 19), lap the bottom of the adjuster to reduce its thickness.

Place the valve and adjuster in the valve lapping guide and slide the adjuster back and forth over the oil stone.



[1] VALVE LAPPING GUIDE
No. 07975–8920000

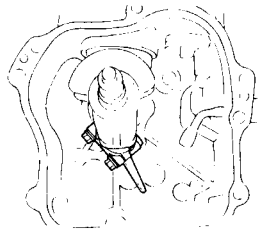
11. PISTON/CRANKSHAFT/CYLINDER

a. DISASSEMBLY/REASSEMBLY

- CRANKSHAFT/CAMSHAFT

[1] CONNECTING ROD CAP

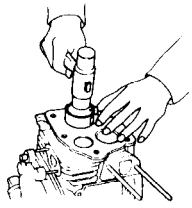
REASSEMBLY:
Install cap with oil dipper pointed toward camshaft as shown.

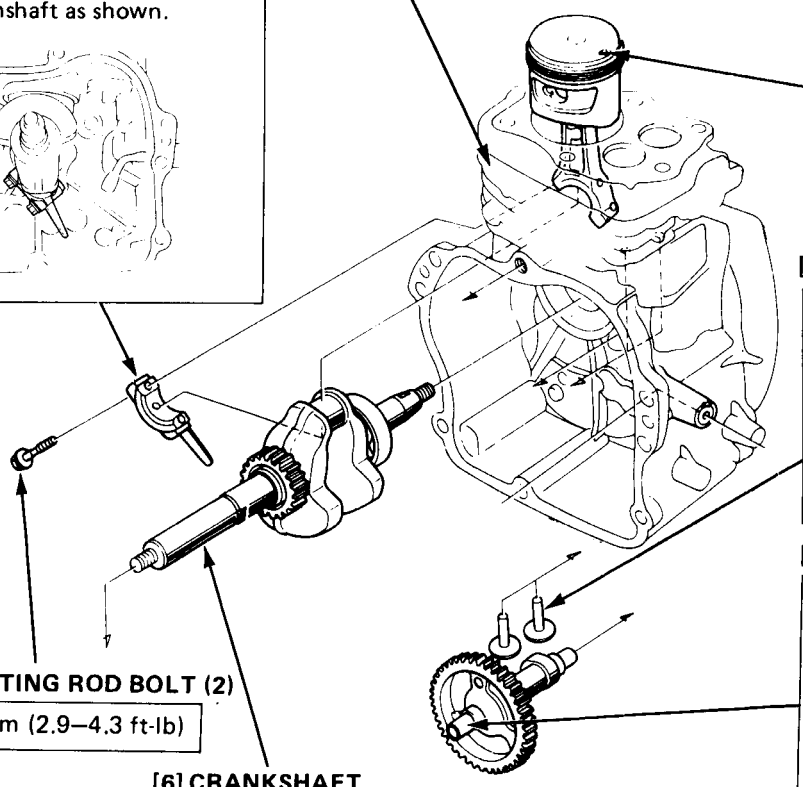


[2] CYLINDER BARREL

[3] PISTON

REASSEMBLY:
Install with mark "△" toward valves. Compress piston rings with a commercially available PISTON RING COMPRESSOR when installing piston.





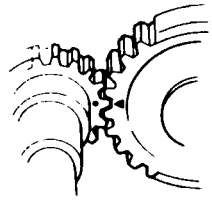
[4] VALVE LIFTER

DISASSEMBLY:
Mark to facilitate identification in reassembly.

REASSEMBLY:
Just before installing camshaft, install lifters. Prevent them from falling down by tilting the cylinder.

[5] CAMSHAFT

REASSEMBLY:
Align timing mark with cranksahft mark.



[7] CONNECTING ROD BOLT (2)

40–60 kg-cm (2.9–4.3 ft-lb)

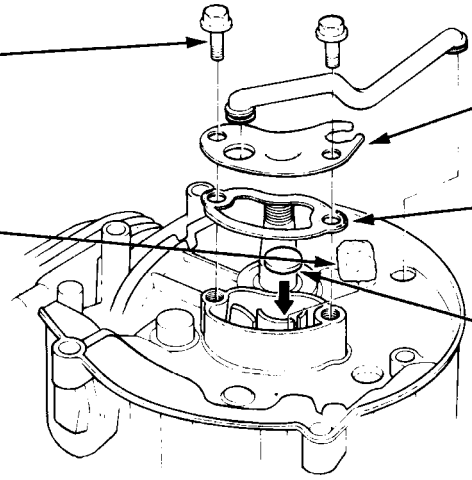
[6] CRANKSHAFT

REASSEMBLY:
Avoid damage to oil seal.

- BREATHER CHAMBER

[1] 6 x 12 F (2)

80–120 kg-cm (5.8–8.7 ft-lb)



[2] BREATHER CHAMBER CAP

[3] BREATHER CAP GASKET

[4] BREATHER VALVE

REASSEMBLY:
Be sure to install the valve to prevent excessive oil loss.

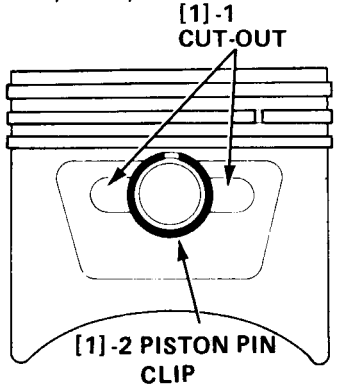
[5] BREATHER FILTER

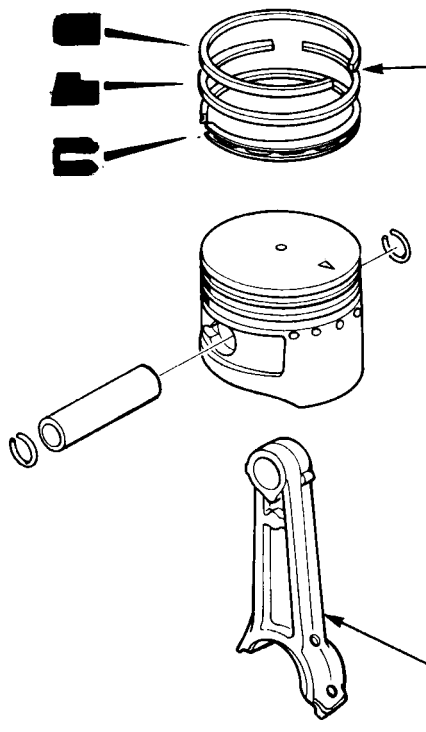
REASSEMBLY:
Check the filter for clogging and tears. Replace if necessary.

• PISTON

[1] PISTON PIN CLIPS

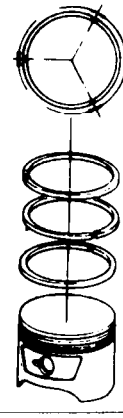
REASSEMBLY:
Install by setting one end of the clip in the piston groove, holding the other end with long-nosed pliers, and rotating the clip in. Do not align the end gap of the clip with the cut-out in the piston pin bore.





[2] PISTON RINGS

REASSEMBLY:
- Install with marking facing up.
- Position the rings so that the end gaps are staggered or equally spaced at 120-deg intervals and are away from piston pin axis.



[3] CONNECTING ROD

ASSEMBLY:
Install rod with longer end facing "△" mark on the piston head.

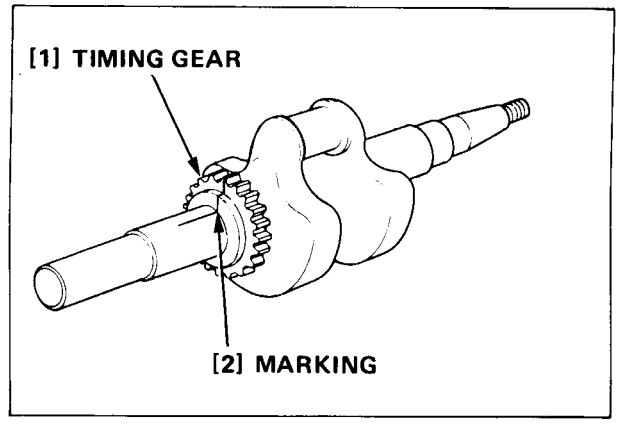
• TIMING GEAR

DISASSEMBLY:

1) Mark a line on the crankshaft and the timing gear as shown.
2) Use a hydraulic press to remove the timing gear.

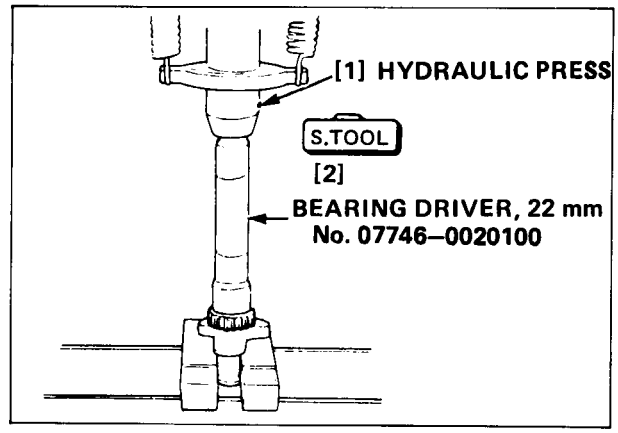
CAUTION:

Do not scratch oil seal surfaces.

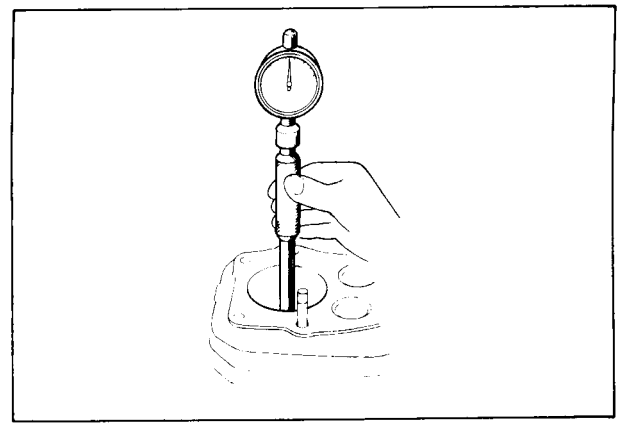


ASSEMBLY:

1) Using the oil timing gear for reference, mark a line at the same position on the new timing gear.
2) Use a hydraulic press and the special tools to press on the new timing gear with the reference marks aligned.



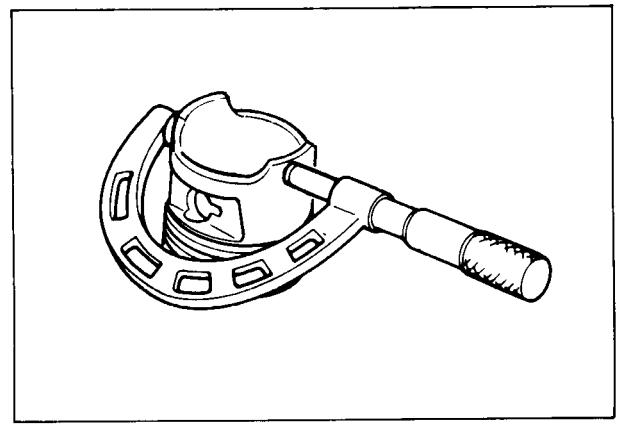
b. INSPECTION



• CYLINDER ID

STANDARD	SERVICE LIMIT
46.0 mm (1.811 in)	46.050 mm (1.813 in)

If the service limit is exceeded, rebore the cylinder and install an oversize piston and piston rings.

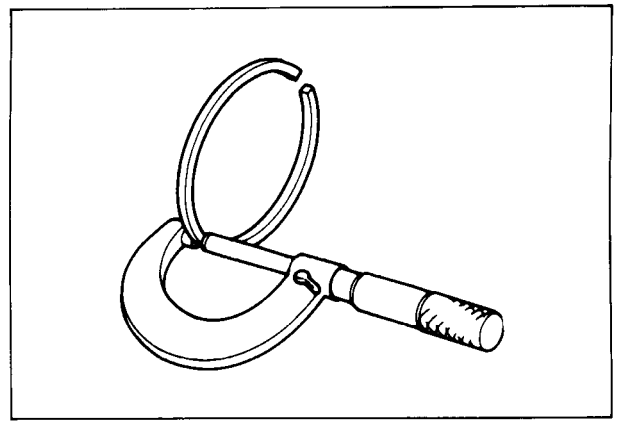


• PISTON SKIRT OD

STANDARD	SERVICE LIMIT
45.995 mm (1.8108 in)	45.920 mm (1.808 in)

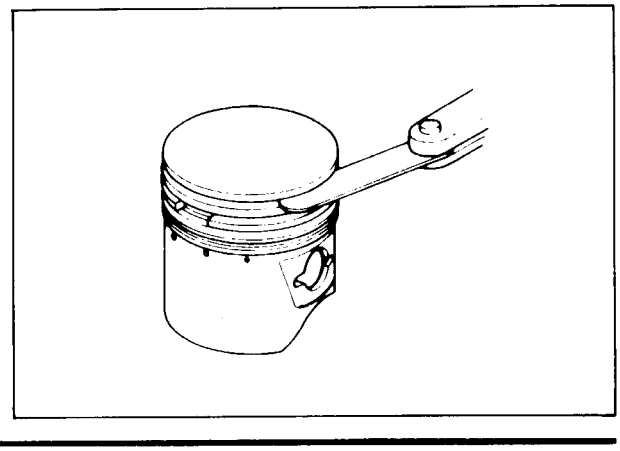
• PISTON-TO-CYLINDER CLEARANCE

STANDARD	SERVICE LIMIT
0– 0.03 mm (0–0.0012 in)	0.13 mm (0.0051 in)



• PISTON RING WIDTH

	STANDARD	SERVICE LIMIT
TOP/ SECOND	1.5 mm (0.0591 in)	1.37 mm (0.0539 in)



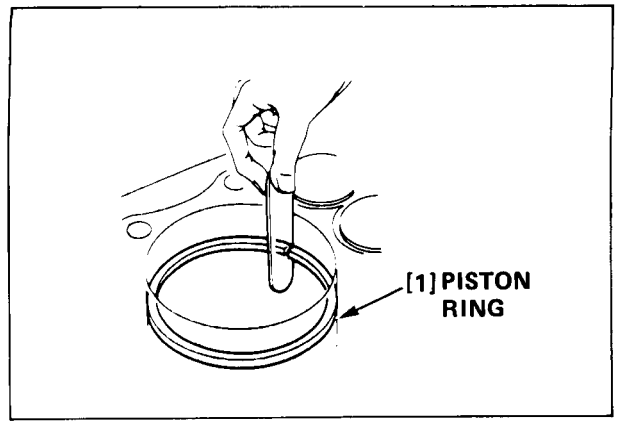
• PISTON RING SIDE CLEARANCE

	STANDARD	SERVICE LIMIT
TOP	0.055– 0.090 mm (0.0022– 0.0035 in)	0.15 mm (0.0059 in)
SECOND	0.055– 0.085 mm (0.0022– 0.0033 in)	0.15 mm (0.0059 in)

- PISTON RING END GAP

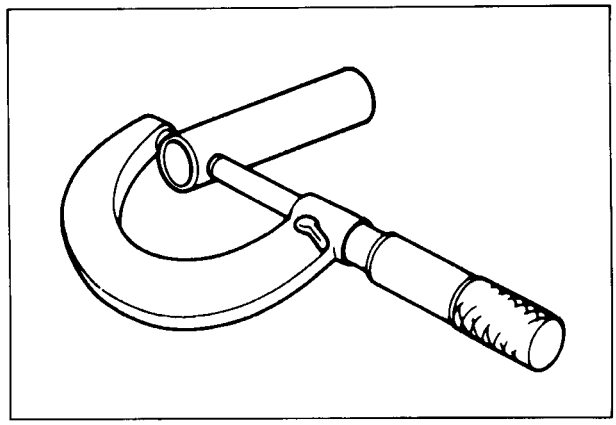
	STANDARD	SERVICE LIMIT
TOP SECOND	0.15–0.35 mm (0.0059–0.014 in)	1.00 mm (0.039 in)
OIL	0.2–0.8 mm (0.0079–0.031 in)	1.00 mm (0.039 in)

Before measuring ring end gap, use the piston top to position the ring so it will not be cocked in the cylinder bore.



- PISTON PIN OD

STANDARD	SERVICE LIMIT
10.0 mm (0.3937 in)	9.950 mm (0.3917 in)

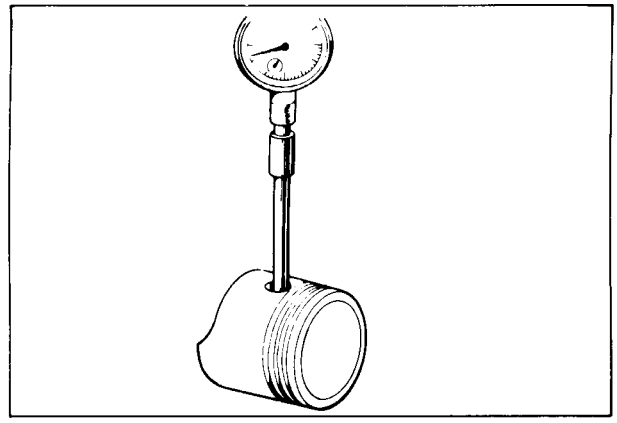


- PISTON PIN BORE ID

STANDARD	SERVICE LIMIT
10.002 mm (0.3938 in)	10.05 mm (0.3957 in)

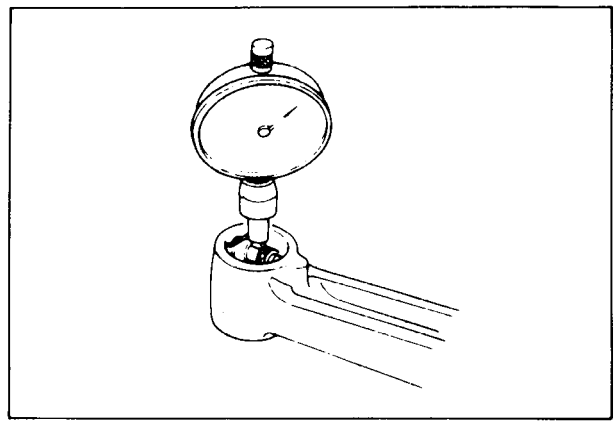
- PISTON-TO-PIN BORE CLEARANCE

STANDARD	SERVICE LIMIT
0.015 mm (0.0006 in)	0.1 mm (0.0039 in)



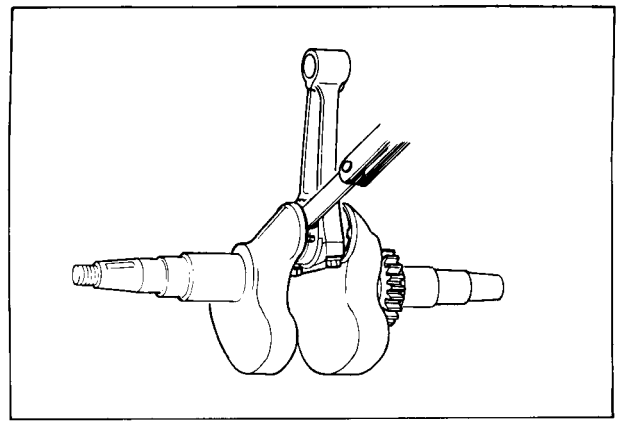
- CONNECTING ROD SMALL END ID

STANDARD	SERVICE LIMIT
10.006 mm (0.3939 in)	10.050 mm (0.3957 in)



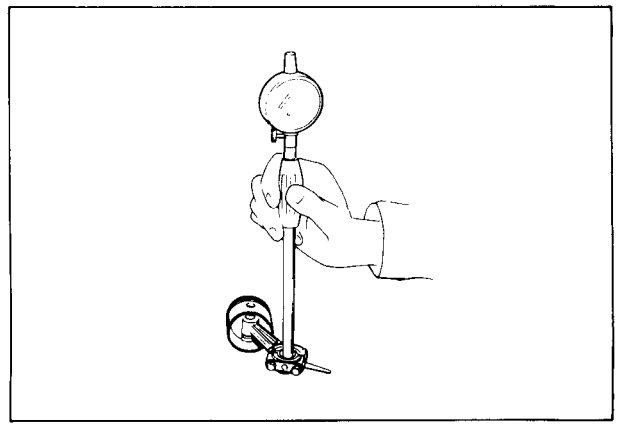
• CONNECTING ROD BIG END SIDE CLEARANCE

STANDARD	SERVICE LIMIT
0.20–0.90 mm (0.0079–0.035 in)	1,10 mm (0.043 in)



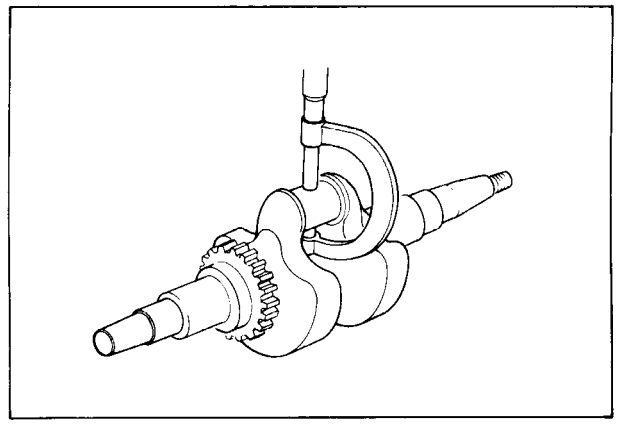
• CONNECTING ROD BIG END ID

STANDARD	SERVICE LIMIT
18.0 mm (0.7087 in)	18.040 mm (0.7102 in)



• CRANK PIN OD

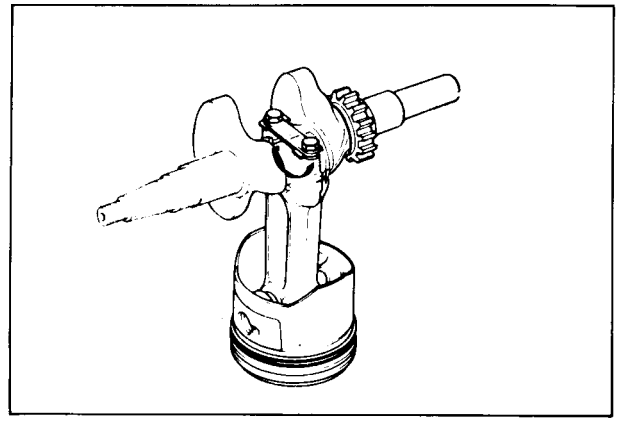
STANDARD	SERVICE LIMIT
17.984 mm (0.7080 in)	17.940 mm (0.7063 in)



• OIL CLEARANCE

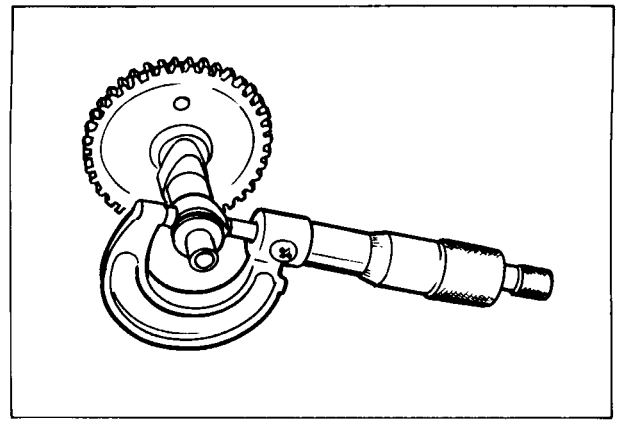
STANDARD	SERVICE LIMIT
0.016–0.038 mm (0.00063–0.0015 in)	0,10 mm (0.004 in)

Measure with plastigauge.



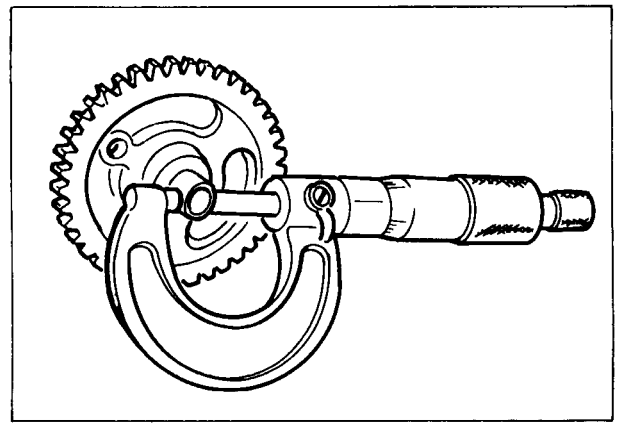
• CAM HEIGHT

	STANDARD	SERVICE LIMIT
IN/EX	20.82 mm (0.8197 in)	20.47 mm (0.8059 in)



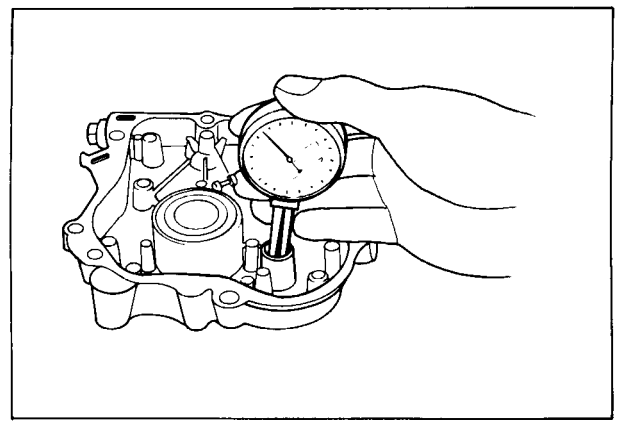
• CAMSHAFT OD

STANDARD	SERVICE LIMIT
12.184 mm (0.4797 in)	12.15 mm (0.4783 in)

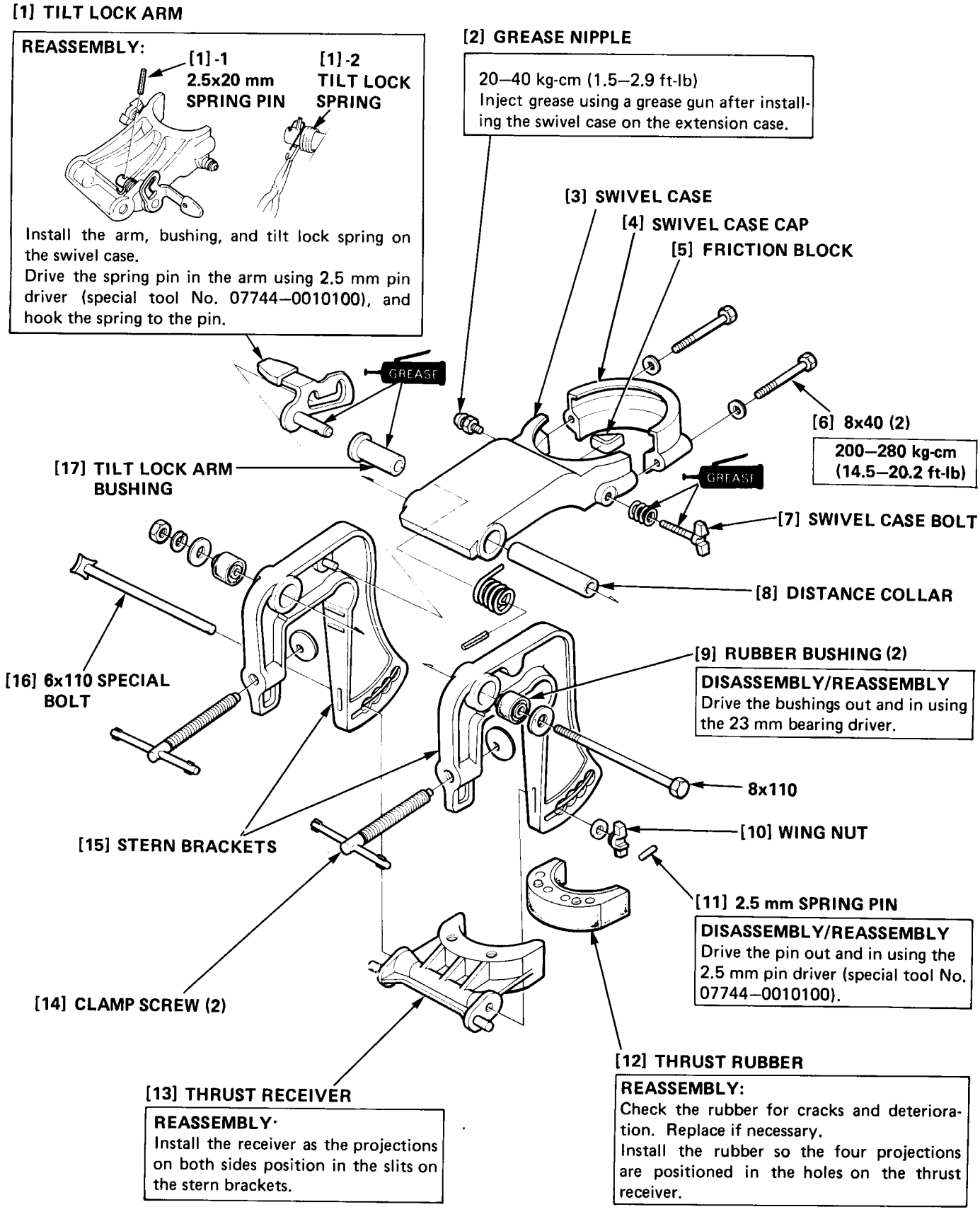


• CAMSHAFT JOURNAL ID

STANDARD	SERVICE LIMIT
12.20 mm (0.4803 in)	12.25 mm (0.4823 in)



12. STERN BRACKET/EXTENSION CASE

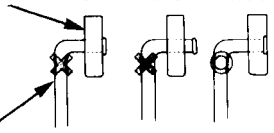


• EXTENSION CASE

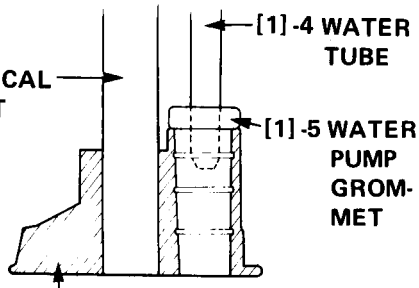
[1] WATER TUBE

REASSEMBLY:
- Insert the tube into the seal rubber A as shown.

[1]-1 WATER SEAL RUBBER A



[1]-2 WATER TUBE
- Slide the water pump grommet into the impeller cover holder until its flange bears against the cover holder.



[2] WATER SEAL RUBBER A

REASSEMBLY:
Seat the groove onto the edge of the cutout in the extension case securely.

[3] WATER SEAL RUBBER B

[4] EXHAUST GUIDE

REASSEMBLY:
Do not let it project above the oil pan mating surface of the extension case.

[5] 6x32F (3)

80–120 kg-cm (5.8–8.7 ft-lb)

GREASE

[6] SWIVEL CASE LINER

REASSEMBLY:
- Before installation, check for wear or damage.
- Install on the extension case with the wide flange facing up.

[6]-1 ANTI-CAVITATION PLATE

[6]-2 SWIVEL CASE LINER

[7] EXTENSION CASE

[8] 6x35

80–120 kg-cm (5.8–8.7 ft-lb)

[9] IMPELLER COVER HOLDER

[10] WAGER PUMP GROMMET

[11] 6x35

80–120 kg-cm (5.8–8.7 ft-lb)

13. GEAR CASE/VERTICAL SHAFT/WATER PUMP

• PROPELLER

[1] WATER SEAL 11x21x8mm

DISASSEMBLY:
Pry off with the end of a screwdriver (–).
REASSEMBLY:
Pack all cavities with water-resistant grease.
Install the seal with the lettered side facing out, and use the special tools to drive it in until it bottoms against the propeller shaft holder.
Check to be sure the seal is not binding or distorted after installation.

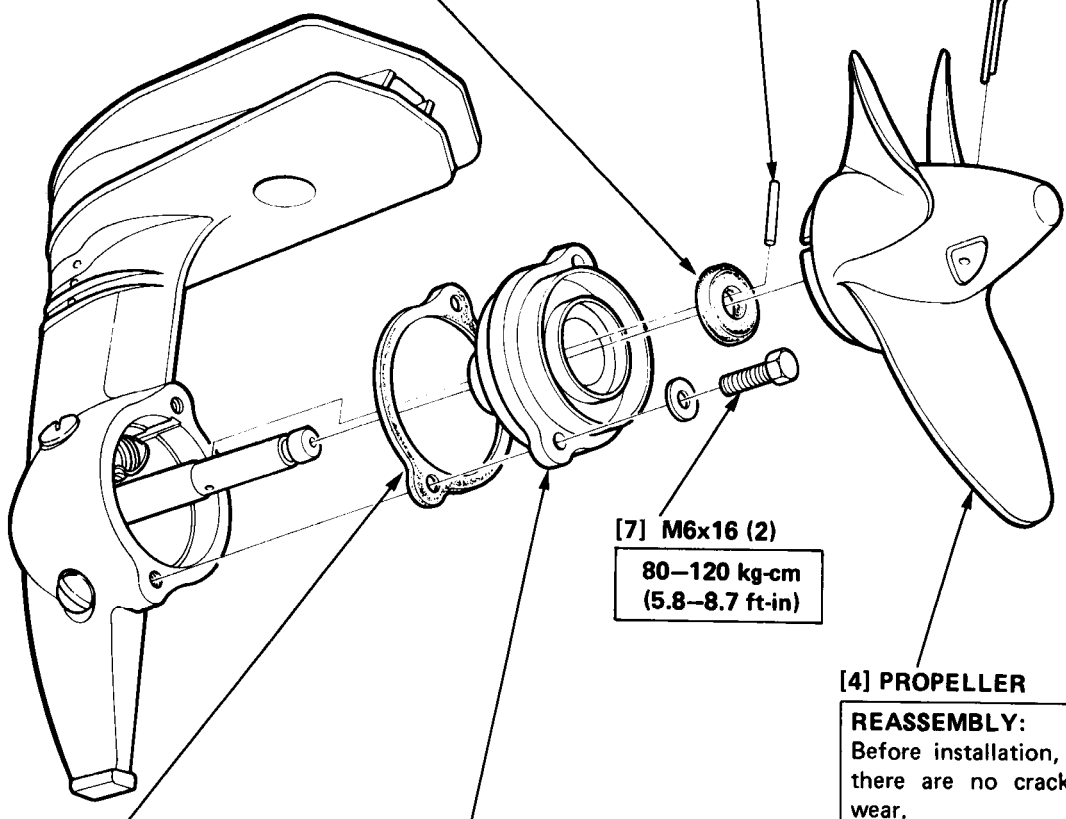
S TOOL
[1]-1
DRIVER
No. 07749– 0010000
ATTACHMENT
No. 07746–004100

[3] 3 mm COTTER PIN

REASSEMBLY:
Be sure to use a genuine Honda Stainless Pin, being careful to align with the groove in the propeller shaft.

[2] SHEAR PIN

REASSEMBLY:
- Difficulty would be encountered in removing if corroded.
- Replace with a new one when badly corroded.



[7] M6x16 (2)
80–120 kg-cm (5.8–8.7 ft-in)

[4] PROPELLER

REASSEMBLY:
Before installation, make sure that there are no cracks or abnormal wear.
Install so that the 3 mm split pin is inserted through the groove in the inner bushing.

[6] PROPELLER SHAFT HOLDER PACKING

REASSEMBLY:
Replace if broken or damaged.

[5] PROPELLER SHAFT HOLDER

REASSEMBLY:
Remove all traces of gasket material from the gear case mating surface, then slide onto the propeller shaft, being careful not to invert the sealing lip of the water seal or to dislodge the spring.

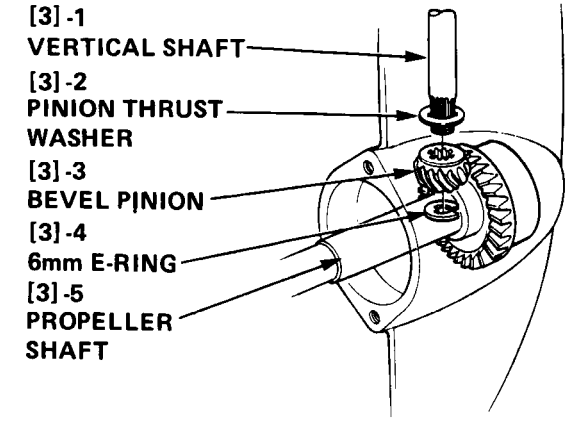
• BEVEL PINION/VERTICAL SHAFT

[1] VERTICAL SHAFT

[2] 6 mm E-RING

[3] BEVEL PINION

REASSEMBLY:
After installing the propeller shaft in the gear case, slide the pinion thrust washer and bevel pinion onto the vertical shaft and secure with a 6 mm E-ring.



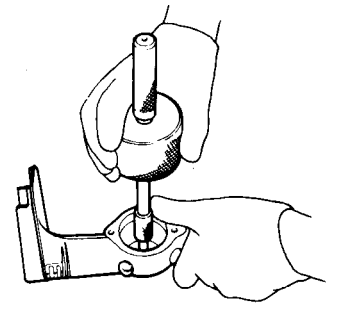
Check the vertical shaft, bevel pinion and propeller shaft for smooth rotation.

[4] PROPELLER SHAFT

[5] GEAR WASHER

[6] 6000 BALL BEARING

DISASSEMBLY:
Use the BEARING REMOVER (special tool).



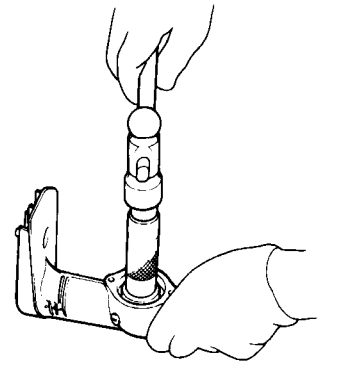
REASSEMBLY:
Use the special tools to drive in the bearing until it bottoms in the gear case. Be sure the bearing is seated squarely in the gear case.

S. TOOL

[6]-1
DRIVER
No. 07749– 0010000

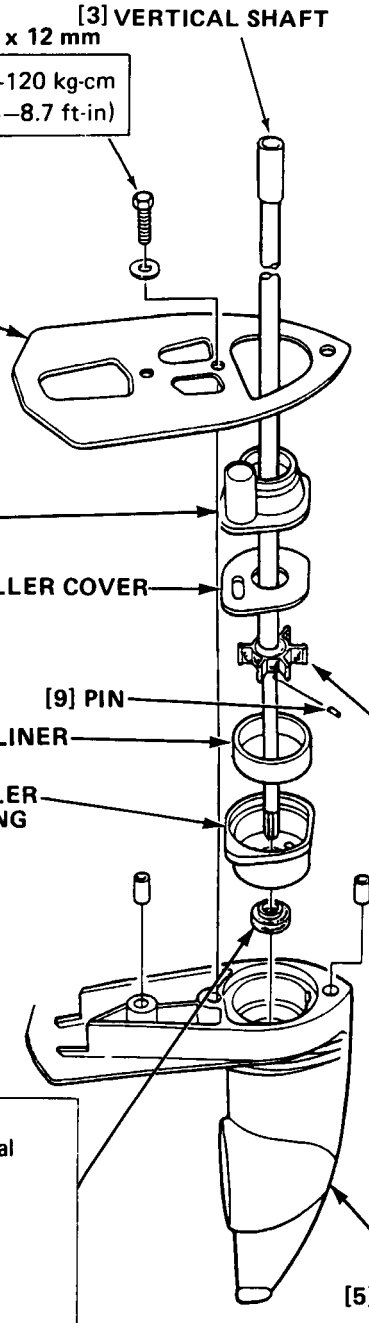
ATTACHMENT, 32x35 mm
No. 07746– 0010100

PILOT, 10 mm
No. 07746– 0040100



[7] OIL CHECK BOLT

• WATER PUMP



[1] EXTENSION PLATE

REASSEMBLY:
Check for warpage or damage before installing. Install the 6 mm bolt while holding the impeller cover holder. Make sure the extension plate contacts the gear case all the way around.

[11] IMPELLER COVER HOLDER

REASSEMBLY:
Replace if cracked or damaged.

[4] WATER PUMP IMPELLER

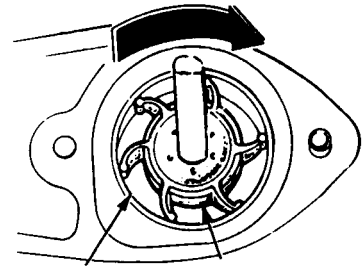
The water pump impeller is keyed to the vertical shaft by a pin that must be removed and installed beneath the impeller.

REMOVAL:

1. Slide the impeller up the shaft to expose the pin.
2. Remove the pin, and slide the impeller down, off the shaft.

INSTALLATION:

1. Install the impeller on the vertical shaft with the impeller keyway facing downward.
2. Slide the impeller up the shaft, and insert the pin below the impeller.
3. Align the impeller keyway with the pin, and slide the impeller down over the pin.
4. Seat the impeller in the pump liner while rotating the impeller and shaft clockwise. The impeller vanes must bend awat from the direction of rotation, as shown.



[4]-1 PUMP LINER [4]-2 WATER PUMP IMPELLER

[6] WATER SEAL 11 x 21 x 8 mm

DISASSEMBLY:
Remove the seal using the following special tools.

S. TOOL
[6]-1
BEARING REMOVER, 15 mm
No. 07936–KC10500

S. TOOL
[6]-2
WEIGHT
No. 07936–3710200

REASSEMBLY:
Pack all cavities with water-resistant grease. Install the seal with the lettered side facing up, and use the special tools to drive it in until it bottoms against the gear case. Check to be sure the seal is not binding or distorted after installation.

S. TOOL
[6]-3
DRIVER
No. 07749–0010000

S. TOOL
[6]-4
PILOT, 22 mm
No. 07746–0041000

1. TRANSISTORIZED IGNITION SYSTEM

< Outline >

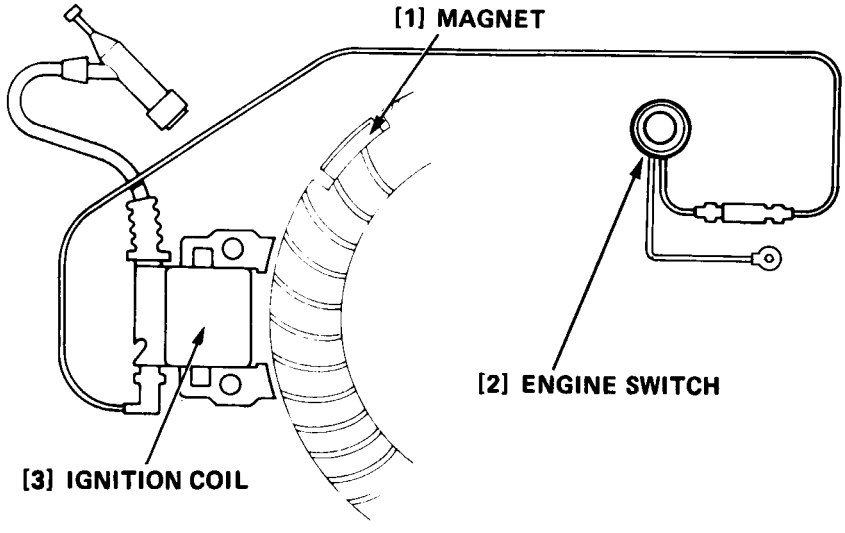
The transistorized ignition coil is of the contactless ignition type consisting of electronic transtorized circuits. The traisistors and the ignition coil are molded together to form a single ignition unit. This type of unit has the following advantages:

- Inspection and maintenance are unnecessary.
- Excellent resistance to water and dust.
- Excellent durability.
- Stable starting.
- Simple structure: Simpler than previous types of CDI because there is no exciter coil. Adjustment is easy since the ignition coil is attached to the outer rim of the flywheel.

< Operating Principles >

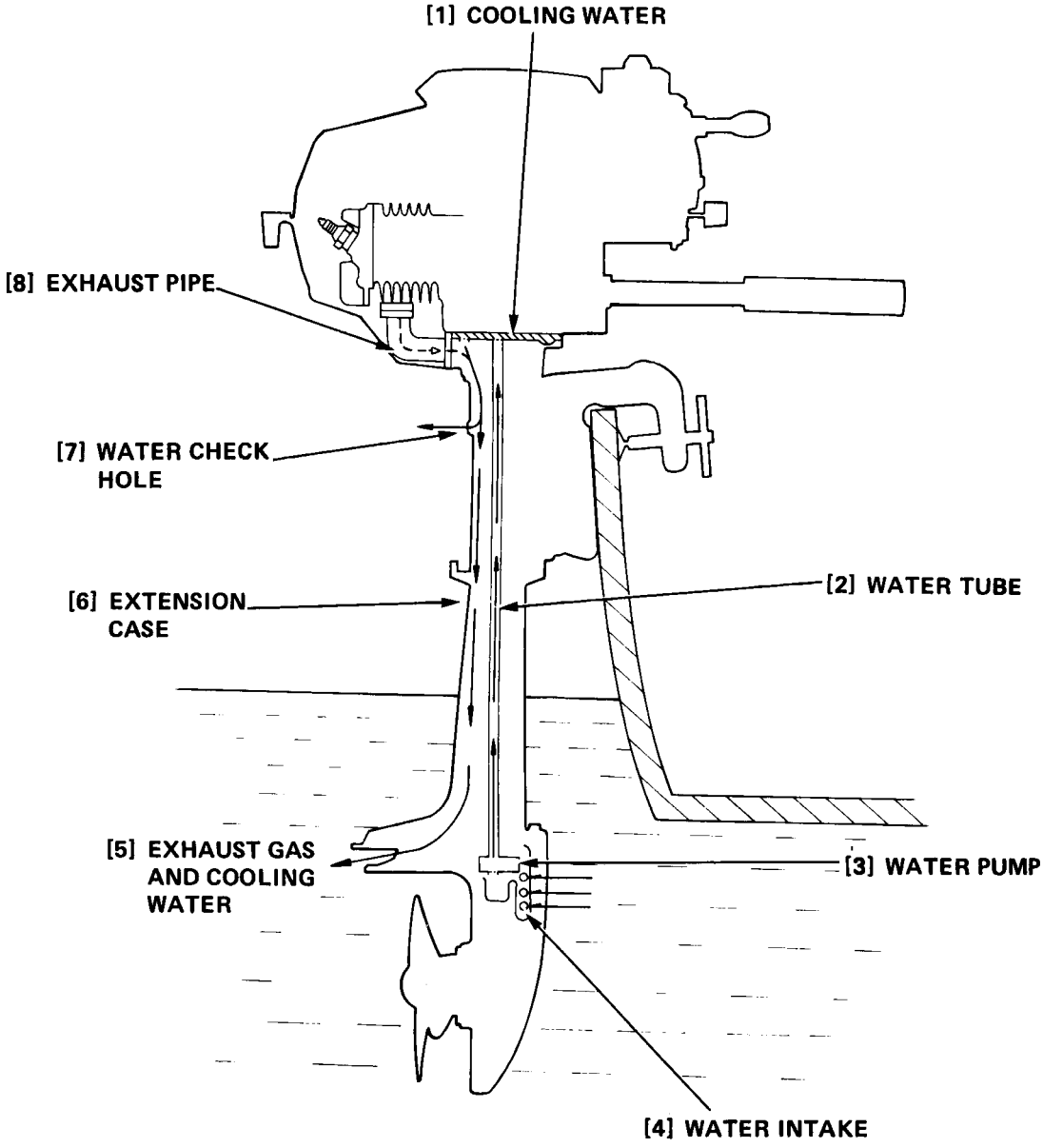
(1) In the ignition coil primary winding inside the transistorized ignition coil, a small voltage is generated due to rotation of the magnet attached to the outer circumference of the flywheel. When the transistor inside the unit is turned off (same function as with points), the current in the primary coil winding is stopped, the magnetic field collapses and a voltage of several hundred volts is produced in the primary coil winding due to electromagnetic induction.

(2) A high voltage is generated in the secondary coil winding of the unit due to this primary coil winding voltage, and sparking occurs at the spark plug.



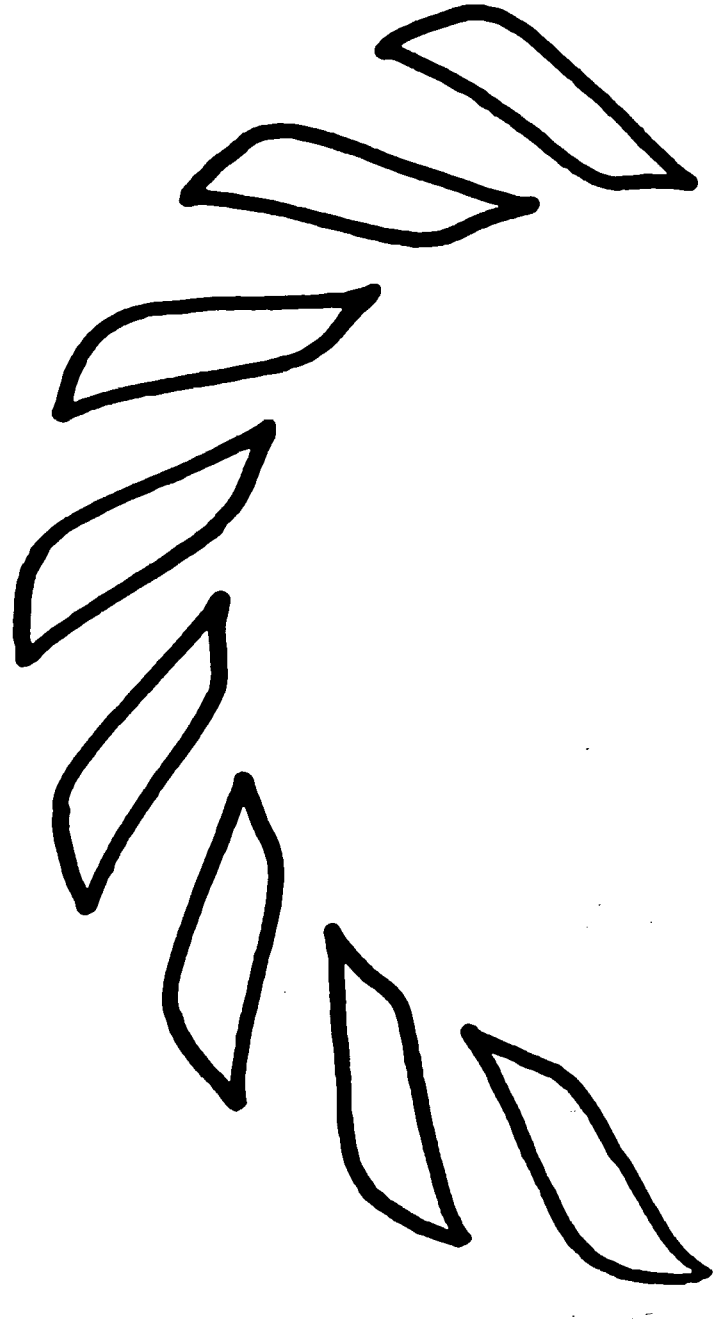
2. EXHAUST SYSTEM

Exhaust gas is discharged under water for quiet operation.
Cooling water is pumped through the extension case to stabilize the operating temperature of the exhaust system and is discharged with the exhaust gas.



HONDA

BF2A



SHOP MANUAL

PREFACE

This supplement describes the major differences between Honda BF2A Outboard Motor (Serial No. 1100001-1199999) and BF2A Outboard Motor (Serial No. 1200001 and subsequent).

For service information which is not covered in this supplement, please refer to the base shop manual, part number 66ZV001.

HONDA MOTOR CO., LTD.
SERVICE PUBLICATIONS OFFICE

CONTENTS

1. SPECIFICATIONS

DIMENSIONS AND WEIGHTS

Type	S	L
Description code	BAES	BAEL
Overall length	410 mm (16.1 in)	
Overall width	275 mm (10.8 in)	
Overall height	930 mm (36.6 in)	1,080 mm (42.5 in)
Dry weight	12.5 kg (27.6 lb)	13.0 kg (28.7 lb)
Operating weight	13.5 kg (30.0 lb)	14.0 kg (30.9 lb)
Transom height	420 mm (16.5 in)	570 mm (22.4 in)
Transom angle	4 stages (5°–10°–15°–20°)	
Tilting	1 stage	
Swivel angle	360°	

ENGINE

Type	4-stroke, side valve, 1 cylinder
Displacement	76 cm^3 (4.6 cu.in)
Bore and stroke	46 x 46 mm (1.8 x 1.8 in)
Max. horsepower	2.0 HP (1.5 kW)/4,000–5,000 min^{-1} (rpm) [at full throttle]
Max. torque	6.2 N·m (0.62 kg-m, 4.5 ft-lb)
Ignition system	Transistorized magneto
Ignition timing	20° B.T.D.C. (Fixed)

II. SERVICE INFORMATION

1. MAINTENANCE STANDARDS

PART	ITEM		STANDARD	SERVICE LIMIT
Engine	Idle speed		1,300 ± 100 min^{-1} (rpm)	—
	Cylinder compression		6.5 kg/cm^2 (92.4 psi) at 800 rpm	—
Carburetor	Main jet		#65	—
	Pilot screw opening		1-1/4 turns out	—
	Float height		10.5–13.5 mm (0.413–0.531 in)	—
Spark plug	Gap		0.6–0.7 mm (0.024–0.028 in)	—
Transistor unit	Primary side		0.7–0.9Ω	—
	Secondary side		6.3–7.7KΩ	—
	Air gap		0.2–0.6 mm (0.008–0.024 in)	—
Valve	Valve clearance	IN	0.08–0.16 mm (0.003–0.006 in)	—
		EX	0.08–0.16 mm (0.003–0.006 in)	—
	Stem O.D.	IN	5.490 mm (0.216 in)	5.45 mm (0.215 in)
		EX	5.445 mm (0.214 in)	5.40 mm (0.213 in)
	Guide I.D.	IN/EX	5.50 mm (0.217 in)	5.56 mm (0.219 in)
	Stem-to-guide clearance	IN	0.010 mm (0.0004 in)	0.11 mm (0.004 in)
		EX	0.055 mm (0.0022 in)	0.16 mm (0.006 in)
	Seat width	IN/EX	0.7 mm (0.028 in)	1.0 mm (0.04 in)
	Spring free length		27.1 mm (1.07 in)	25.0 mm (0.98 in)
Cylinder	Sleeve I.D.		46.00 mm (1.8110 in)	46.05 mm (1.813 in)
Piston	Skirt O.D.		45.995 mm (1.8108 in)	45.92 mm (1.808 in)
	Piston-to-cylinder clearance		0–0.03 mm (0–0.0012 in)	0.13 mm (0.0051 in)
	Pin bore I.D.		10.002 mm (0.3938 in)	10.05 mm (0.3957 in)
Piston pin	O.D.		10.00 mm (0.3937 in)	9.95 mm (0.3917 in)
	Pin-to-pin bore clearance		0.015 mm (0.0006 in)	0.10 mm (0.0039 in)
Piston ring	Width	Top/Second	1.5 mm (0.0591 in)	1.37 mm (0.0539 in)
	Side clearance	Top	0.055–0.090 mm (0.0022–0.0035 in)	0.15 mm (0.0059 in)
		Second	0.055–0.085 mm (0.0022–0.0033 in)	0.15 mm (0.0059 in)
	End gap	Top/Second	0.15–0.35 mm (0.0059–0.014 in)	1.0 mm (0.039 in)
		Oil	0.2–0.8 mm (0.0079–0.031 in)	1.0 mm (0.039 in)
Connecting rod	Small end I.D.		10.006 mm (0.3939 in)	10.05 mm (0.3957 in)
	Rod-to-pin clearance		0.006–0.023 mm (0.00024–0.00091 in)	0.10 mm (0.0039 in)
	Big end oil clearance		0.016–0.038 mm (0.00063–0.0015 in)	0.10 mm (0.0039 in)
	Big end axial clearance		0.20–0.90 mm (0.0079–0.035 in)	1.10 mm (0.043 in)
	Big end I.D.		18.00 mm (0.7087 in)	18.04 mm (0.7102 in)
Crankshaft	Crank pin O.D.		17.984 mm (0.7080 in)	17.94 mm (0.7063 in)
Camshaft	Cam height	IN/EX	20.82 mm (0.8197 in)	20.47 mm (0.8059 in)
	Journal O.D.		12.184 mm (0.4797 in)	12.15 mm (0.4783 in)
Crankcase	Journal I.D.		12.20 mm (0.4803 in)	12.25 mm (0.4823 in)
Propeller shaft	O.D. at bevel gear		10.973–10.984 mm (0.4320–0.4324 in)	10.93 mm (0.4303 in)
Propeller shaft holder	Shaft bore I.D.		11.000–11.018 mm (0.4331–0.4338 in)	11.06 mm (0.4354 in)
	Shaft-to-shaft bore clearance		0.016–0.045 mm (0.0006–0.0018 in)	—
Vertical shaft	O.D. at gear case		10.973–10.984 mm (0.4320–0.4324 in)	10.93 mm (0.4303 in)
Gear case	Vertical shaft bore I.D.		11.000–11.018 mm (0.4331–0.4338 in)	11.06 mm (0.4354 in)
	Vertical shaft-to-bore clearance		0.016–0.045 mm (0.0006–0.0018 in)	—

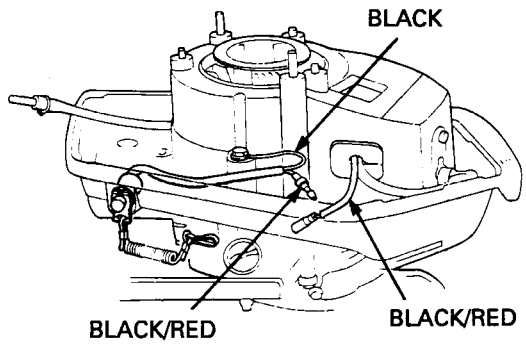
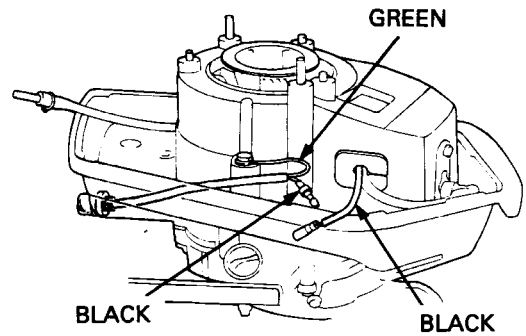
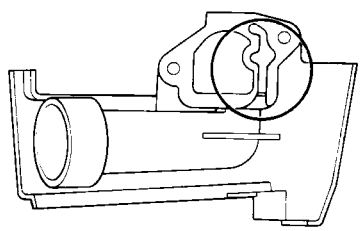
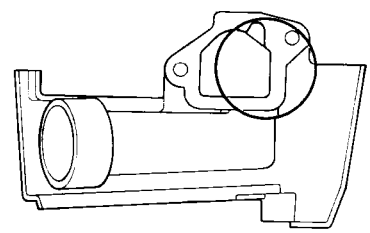
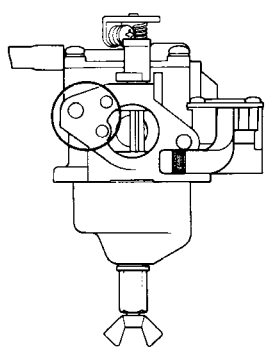
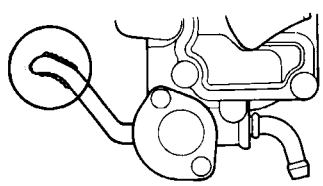
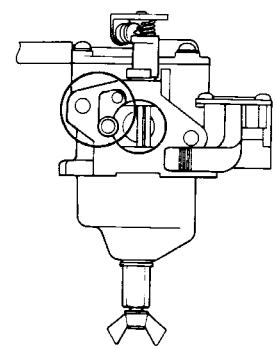
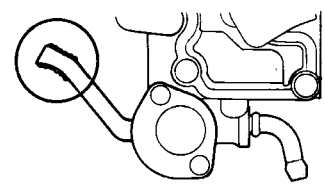
2. MAINTENANCE SCHEDULE

ITEM \ REGULAR SERVICE PERIOD Performed at every indicated month or operating hour interval, whichever comes first. (2)		EACH USE	FIRST MONTH OR 20 HRS	EVERY 6 MONTHS OR 100 HRS	EVERY YEAR OR 200 HRS
Engine oil	Check level	○			
	Change		○	○	
Gear case oil	Check level			○	
	Change		○		○
	Check for water contamination			○	
Starter rope	Check			○	
Carburetor linkage	Check		○	○	
Valve clearance	Check - Readjust		○		○
Spark plug	Check - Clean			○	
Shear pin	Check			○	
Lubrication	Grease		○ (1)	○ (1)	
Fuel tank and filter	Clean				○
Combustion chamber and valves	Clean - Relap	Every 300 hours			
Fuel line	Check (Replace if necessary)	○	Every 2 years		

NOTE: (1) Lubricate more frequently when used in salt water.
(2) For professional commercial use, log hours of operation to determine proper maintenance intervals.

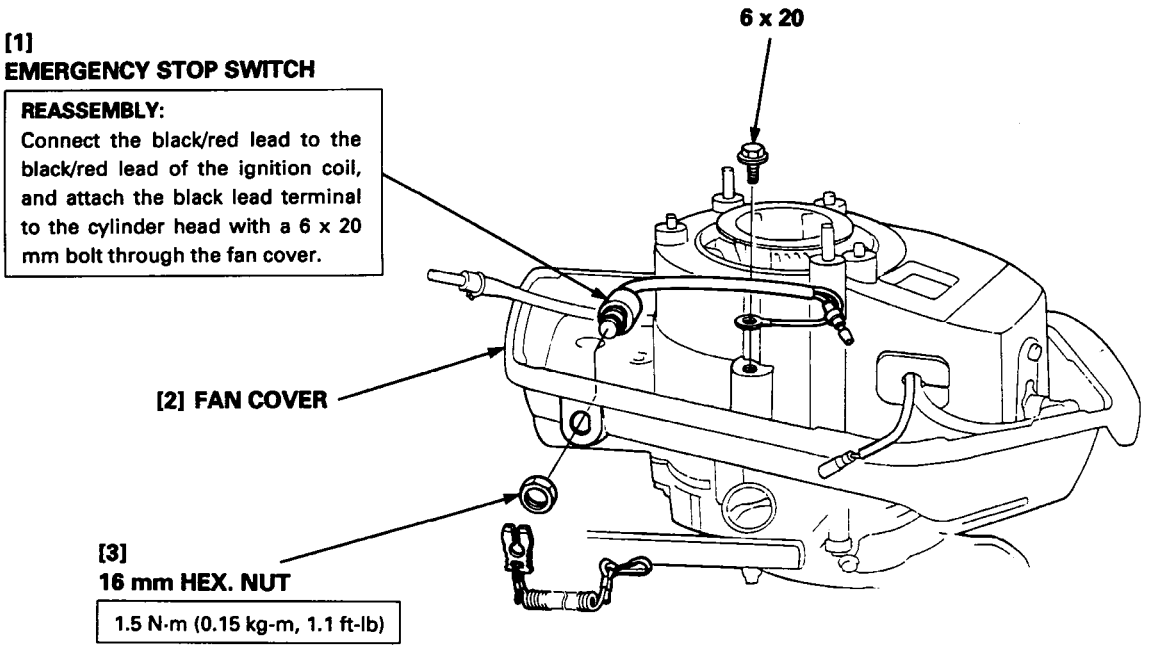
III. OUTLINE OF CHANGES

1. OUTLINE OF CHANGES

PARTS DESCRIPTION	Frame serial number: BAES/BAEL 1200001 and subsequent	Frame serial number: BAES/BAEL 1100001–1199999
OIL CHECK BOLT		
EMERGENCY STOP SWITCH/ FAN COVER/ STOP SWITCH CORD		
AIR GUIDE		
CARBURETOR/ FUEL COCK LEVER	 	 

1. EMERGENCY STOP SWITCH/FAN COVER

a. DISASSEMBLY/REASSEMBLY



b. INSPECTION

- EMERGENCY STOP SWITCH

Attach the tester leads to the two terminals of the emergency stop switch and check for continuity.

Switch clip	Continuity
Yes	No
No	Yes

In case that the switch clip is set, there should be continuity when the button is pushed.