



HONDA
MARINE

IT'S ALL ABOUT POWER.

SERVICE MANUAL BF2D



PREFACE

This manual covers the construction, function and servicing procedures of the Honda BF2D outboard motor.

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

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1. SPECIFICATIONS
• DIMENSIONS AND WEIGHTS

Type	S	L	SH	LH	SC	LC	SCH	LCH
Description code	BZBK				BZBF			
Overall length	410 mm (16.1 in)							
Overall width	280 mm (11.0 in)							
Overall height	945 mm (37.2 in)	1,100 mm (43.3 in)	945 mm (37.2 in)	1,100 mm (43.3 in)	945 mm (37.2 in)	1,100 mm (43.3 in)	945 mm (37.2 in)	1,100 mm (43.3 in)
Dry weight	12.1 kg (26.7 lb)	12.7 kg (28.0 lb)	12.4 kg (27.3 lb)	13.0 kg (28.7 lb)	12.4 kg (27.3 lb)	13.0 kg (28.7 lb)	12.7 kg (28.0 lb)	13.3 kg (29.3 lb)
Operating weight	13.1 kg (29.9 lb)	13.7 kg (30.2 lb)	13.4 kg (29.5 lb)	14.0 kg (30.9 lb)	13.4 kg (29.5 lb)	14.0 kg (30.9 lb)	13.7 kg (30.2 lb)	14.3 kg (31.5 lb)
Transom height	418 mm (16.5 in)	571 mm (22.5 in)	418 mm (16.5 in)	571 mm (22.5 in)	418 mm (16.5 in)	571 mm (22.5 in)	418 mm (16.5 in)	571 mm (22.5 in)
Transom angle	4-stage adjustment (5°, -10°, -15°, -20°)							
Tilt angle adjustment	1-stage adjustment							
Tilt-up angle	75°							
Swivel angle	360°							

• ENGINE

Type	Vertical 4-stroke, overhead valve single cylinder
Displacement	57 cm ³ (3.48 cu in)
Bore x stroke	45.0 x 38.0 mm (1.77 x 1.42 in)
Maximum horsepower	1.5 kW (2.0 PS) at 6,000 min ⁻¹ (rpm)
Maximum torque	2.69 N·m (0.27 kgf·m, 1.95 lbf·ft) at 4,500 min ⁻¹ (rpm)
Compression ratio	8.0 : 1
Fuel consumption	420 g/kW·h (309 g/PS·h, 0.68 lb/PS·h)
Cooling system	Forced air
Ignition system	Transistorized magneto ignition
Ignition timing	27° B.T.D.C.
Spark plug	NGK: CR5HSB, DENSO: U16FSR-UB
Carburetor	Float type
Lubrication system	Forced splash
Oil capacity	0.25 ℓ (0.26 US qt, 0.22 Imp qt)
Starting system	Recoil starter
Stopping system	Primary ground
Fuel used	Automotive unleaded gasoline 91 reach octane, 86 pump octane or higher
Fuel tank capacity	1.0 ℓ (0.26 US gal, 0.22 Imp gal)
Clutch	Centrifugal (SC, LC, SCH and LCH type only)

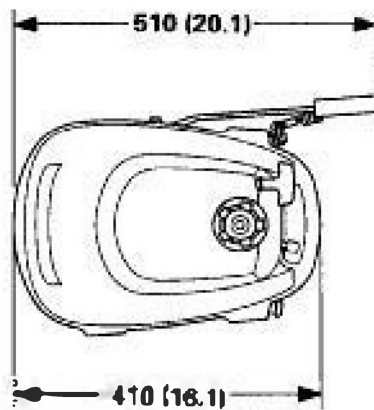
• LOWER UNIT

Type	S, L, SH, LH, SC, LC, SCH, LCH	
Reduction	Spiral bevel gear	
Gear ratio	0.41 (12/29)	
Gear case oil	Hypoid gear oil (SAE #90)	
Gear case oil capacity	0.05 l (0.05 US qt, 0.04 Imp qt)	
Propeller	Type	Aerofoil
	No. of blades x Dia. x Pitch	3 x 184 x 120 mm
	Rotating direction	Clockwise (Viewed from rear)

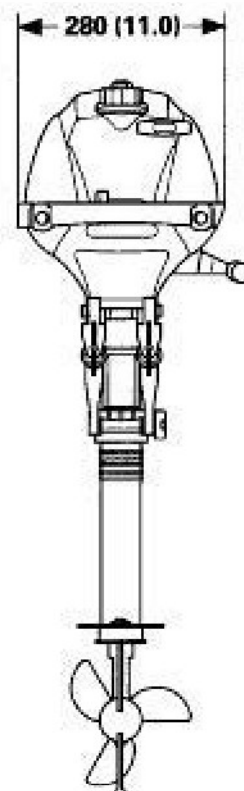
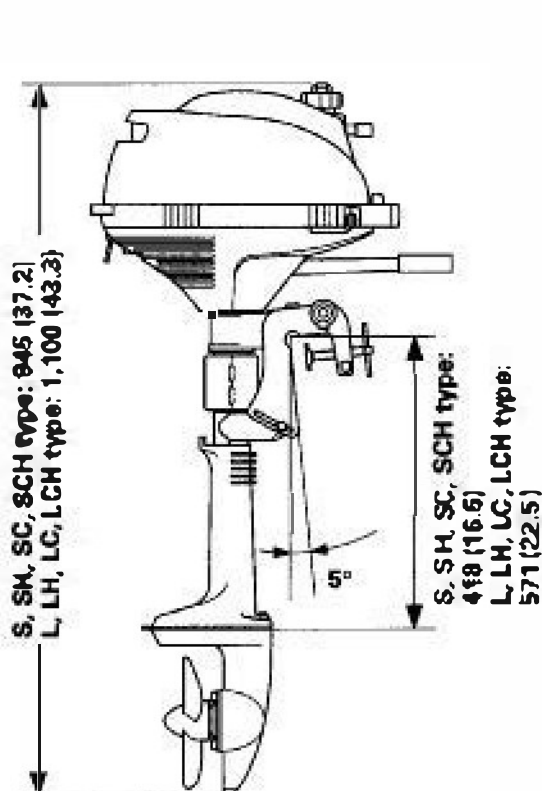
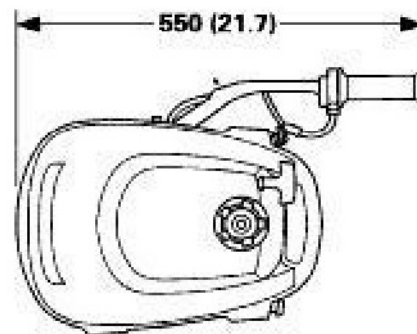
2. DIMENSIONAL DRAWINGS

Unit: mm (In)

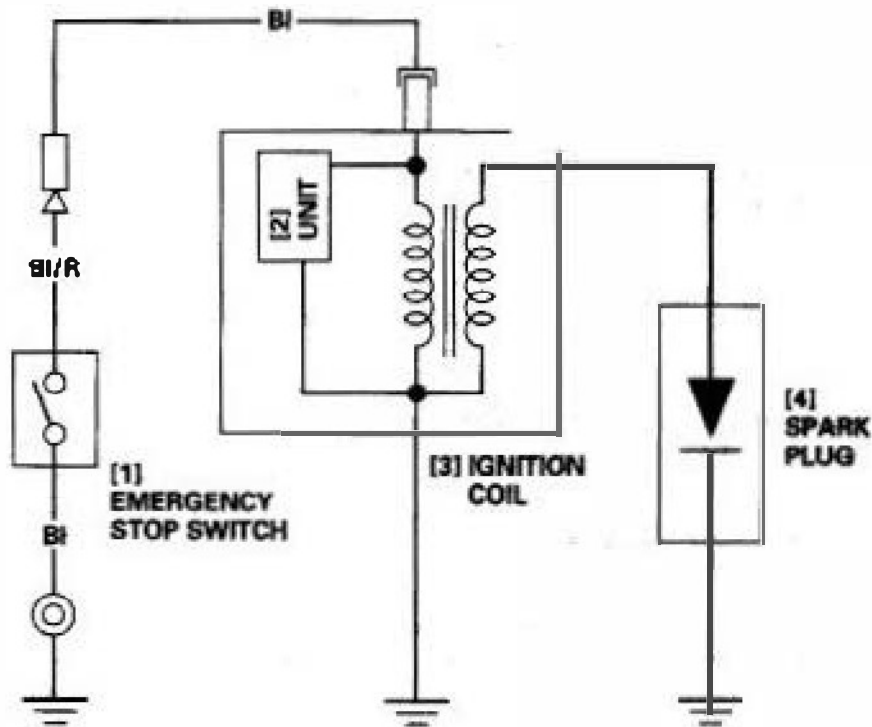
S, L, SC, LC type:



SH, LH, SCH, LCH type:



3. WIRING DIAGRAM



[5]
⊗: Black
⊕: Red

- | | |
|---------------------------------------|----------------------------|
| 1. THE IMPORTANCE OF PROPER SERVICING | 6. TORQUE VALUES |
| 2. IMPORTANT SAFETY PRECAUTIONS | 7. SPECIAL TOOLS |
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| 4. SERIAL NUMBER LOCATION | 9. CABLE & HARNESS ROUTING |
| 5. MAINTENANCE STANDARDS | |

1. THE IMPORTANCE OF PROPER SERVICING

Proper servicing is essential to the safety of the operator and the reliability of the engine. Any error or oversight made by the technician while servicing can easily result in faulty operation, damage to the engine or injury to the operator.

⚠ WARNING

Improper servicing can cause an unsafe condition that can lead to serious injury or death. Follow the procedures and precautions in this shop manual carefully.

Some of the most important precautions are given below. However, we cannot warn you of every conceivable hazard that can arise in performing maintenance or repairs. Only you can decide whether or not you should perform a given task.

⚠ WARNING

Failure to follow maintenance instructions and precautions can cause you to be seriously hurt or killed. Follow the procedures and precautions in this shop manual carefully.

2. IMPORTANT SAFETY PRECAUTIONS

Be sure you have a clear understanding of all basic shop safety practices and that you are wearing appropriate clothing and safety equipment. When performing maintenance or repairs, be especially careful of the following:

- **Read the instructions before you begin, and be sure you have the tools and skills required to perform the tasks safely.**
Be sure that the engine is off before you begin any maintenance or repairs. This will reduce the possibility of several hazards:
- **Carbon monoxide poisoning from engine exhaust.**
Be sure there is adequate ventilation whenever you run the engine.
- **Burns from hot parts.**
Let the engine cool before you touch it.
- **Injury from moving parts.**
Do not run the engine unless the instruction tells you to do so. Even then, keep your hands, fingers, and clothing away.

To reduce the possibility of a fire or explosion, be sure when working around gasoline. Use only a nonflammable solvent, not gasoline, to clean parts. Keep all cigarettes, sparks, and flames away from all fuel-related parts.

3. 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 engine.
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 surfaces 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 threads and ruin the hole.
8. Use only metric tools when servicing this engine. Metric bolts, nuts and screws are not interchangeable with non-metric fasteners. The use of incorrect tools and fasteners will damage the engine.
9. Be sure that the battery built in a tester is fully charged and check the meter before inspection using the tester.
10. Follow the instructions represented by these symbols when they are used.

 : Apply recommended grease.

 : Use special tool.

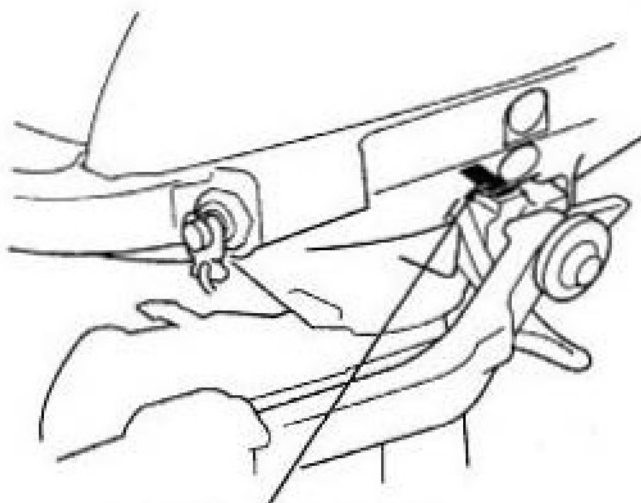
 : Apply oil.

○ x ○ (○): Indicates the diameter, length, and quantity of metric flange bolt used.

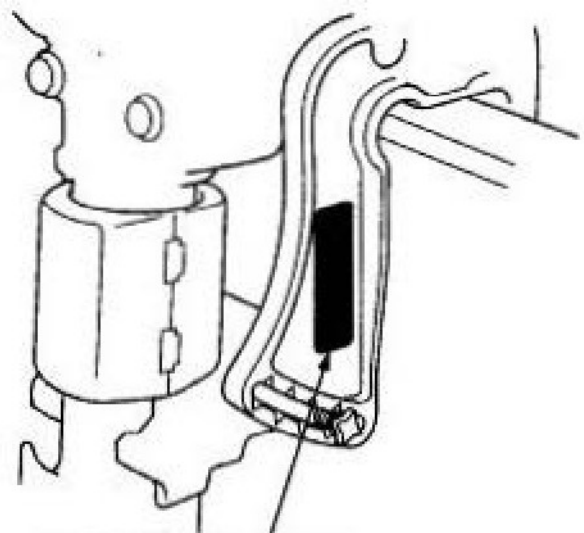
P. ○-○ : Indicates the reference page.

4. SERIAL NUMBER LOCATION

The engine serial number is stamped on the clutch housing and frame serial number is located on the stern bracket. Refer to this when ordering parts or making technical inquiries.



ENGINE SERIAL NUMBER



FRAME SERIAL NUMBER

5. MAINTENANCE STANDARDS

ENGINE

Part	Item	Standard	Service limit	
Engine	Idle speed	2,000 ± 100 min ⁻¹ (rpm)	—	
	Full throttle range	5,000 – 6,000 min ⁻¹ (rpm)	—	
	Cylinder compression	0.88 MPa (9.0 kgf/cm ² 128 psi)/ 1,000 min ⁻¹ (rpm)	—	
Cylinder	Sleeve I.D.	45.000 – 45.015 mm (1.7717 – 1.7722 in)	45.100 mm (1.7756 in)	
Piston	Skirt O.D.	44.97 – 44.99 mm (1.770 – 1.771 in)	44.90 mm (1.768 in)	
	Piston-to-cylinder clearance	0.010 – 0.045 mm (0.0004 – 0.00187 in)	0.120 mm (0.0047 in)	
	Pin bore I.D.	10.002 – 10.008 mm (0.3938 – 0.3940 in)	10.050 mm (0.3957 in)	
Piston pin	O.D.	9.994 – 10.000 mm (0.3935 – 0.3937 in)	9.950 mm (0.3917 in)	
	Pin-to-piston clearance	0.002 – 0.014 mm (0.0001 – 0.0006 in)	0.100 mm (0.0039 in)	
Piston ring	Ring width	Top/second	0.97 – 0.99 mm (0.038 – 0.039 in)	0.920 mm (0.0362 in)
	Ring side clearance	Top/second	0.015 – 0.050 mm (0.0006 – 0.0020 in)	0.120 mm (0.0047 in)
	Ring end gap	Top	0.100 – 0.250 mm (0.0039 – 0.0098 in)	0.600 mm (0.0236 in)
		Second	0.250 – 0.400 mm (0.0098 – 0.0157 in)	0.600 mm (0.0236 in)
Connecting rod	Small end I.D.	10.006 – 10.017 mm (0.3939 – 0.3944 in)	10.050 mm (0.3957 in)	
	Big end I.D.	15.000 – 15.011 mm (0.5906 – 0.5910 in)	15.040 mm (0.5921 in)	
	Big end oil clearance	0.016 – 0.038 mm (0.0006 – 0.0015 in)	0.100 mm (0.0039 in)	
	Big end side clearance	0.1 – 0.6 mm (0.004 – 0.024 in)	0.8 mm (0.031 in)	
Crankshaft	Crank pin O.D.	14.973 – 14.984 mm (0.5895 – 0.5899 in)	14.940 mm (0.5882 in)	
Valves	Valve clearance	IN	0.08 ± 0.02 mm (0.0031 ± 0.0008 in)	—
		EX	0.11 ± 0.02 mm (0.0043 ± 0.0008 in)	—
	Stem O.D.	IN	3.970 – 3.985 mm (0.1563 – 0.1569 in)	3.900 mm (0.1535 in)
		EX	3.935 – 3.950 mm (0.1549 – 0.1555 in)	3.880 mm (0.1528 in)
	Guide I.D.	IN/EX	4.000 – 4.018 mm (0.1575 – 0.1582 in)	4.060 mm (0.1598 in)
	Stem-to-guide clearance	IN	0.015 – 0.048 mm (0.0006 – 0.0019 in)	0.098 mm (0.0039 in)
EX		0.050 – 0.083 mm (0.0020 – 0.0033 in)	0.120 mm (0.0047 in)	
Valve spring	Free length	IN/EX	23.7 mm (0.93 in)	22.8 mm (0.90 in)
Camshaft	Cam height		27.972 mm (1.1013 in)	27.672 mm (1.0894 in)
	I.D. (Bearing)		5.020 – 5.050 mm (0.1976 – 0.1988 in)	5.100 mm (0.2008 in)
Camshaft roller	O.D.		4.990 – 5.000 mm (0.1965 – 0.1969 in)	4.950 mm (0.1949 in)
Valve lifter	I.D. (Bearing)		5.005 – 5.025 mm (0.1970 – 0.1978 in)	5.050 mm (0.1988 in)
Valve lifter roller	O.D.		4.990 – 5.000 mm (0.1965 – 0.1969 in)	4.950 mm (0.1949 in)
Crankcase cover	Camshaft	Bearing I.D.	5.005 – 5.023 mm (0.1970 – 0.1978 in)	5.050 mm (0.1988 in)
	Valve lifter roller	Bearing I.D.	5.005 – 5.023 mm (0.1970 – 0.1978 in)	5.050 mm (0.1988 in)
Cylinder block	Camshaft roller	Bearing I.D.	5.005 – 5.023 mm (0.1970 – 0.1978 in)	5.050 mm (0.1988 in)
	Valve lifter roller	Bearing I.D.	5.005 – 5.023 mm (0.1970 – 0.1978 in)	5.050 mm (0.1988 in)
	Rocker arm roller	Bearing I.D.	4.000 – 4.018 mm (0.1575 – 0.1582 in)	4.050 mm (0.1594 in)
Rocker arm	I.D. (Bearing)		4.005 – 4.025 mm (0.1577 – 0.1585 in)	4.050 mm (0.1594 in)
Rocker arm roller	O.D.		3.990 – 4.000 mm (0.1571 – 0.1575 in)	3.950 mm (0.1555 in)
Clutch	Lining thickness		2.0 mm (0.08 in)	1.0 mm (0.04 in)
Clutch outer	I.D.		78.00 – 78.25 mm (3.071 – 3.081 in)	78.5 mm (3.09 in)

Part	Item	Standard	Service limit
Spark plug	Gap	0.6 - 0.7 mm (0.024 - 0.028 in)	—
Ignition coil	Resistance	Primary side	0.98 - 1.20 Ω
		Secondary side	11 - 15 k Ω
	Air gap	0.3 - 0.5 mm (0.012 - 0.020 in)	—
Carburetor	Main jet	#65	—
	Float height	12 mm (0.47 in)	—
	Pilot screw opening	Except SCG, LCG, SCHG, LCHG type: 2 turns out SCG, LCG, SCHG, LCHG type: 2-1/4 turns out	—

• LOWER UNIT

Part	Item	Standard	Service limit
Propeller shaft	Holder O.D.	10.973 - 10.984 mm (0.4320 - 0.4324 in)	10.930 mm (0.4303 in)
Propeller shaft holder	Shaft bore I.D.	11.000 - 11.018 mm (0.4331 - 0.4338 in)	11.060 mm (0.4354 in)
	Holder-to-shaft clearance	0.016 - 0.045 mm (0.0006 - 0.0018 in)	—
Vertical shaft	Gear case O.D.	10.97 - 10.99 mm (0.432 - 0.433 in)	10.93 mm (0.430 in)
	Vertical bushing O.D.	10.97 - 10.99 mm (0.432 - 0.433 in)	10.93 mm (0.430 in)
Gear case	Vertical shaft bore I.D.	11.000 - 11.018 mm (0.4331 - 0.4338 in)	11.060 mm (0.4354 in)
	Gear case-to-vertical shaft clearance	0.010 - 0.048 mm (0.0004 - 0.0019 in)	—
Vertical shaft bushing	Vertical shaft bore I.D.	11.15 - 11.20 mm (0.439 - 0.441 in)	11.70 mm (0.461 in)
	Bushing-to-vertical shaft clearance	0.16 - 0.23 mm (0.006 - 0.009 in)	—

6. TORQUE VALUES

Item	Thread dia. x pitch type	Tightening torque			Remark
		N·m	kgf·m	lbf·ft	
Spark plug	M10 x 1.0	12	1.2	9	
Crankcase side cover	M5 x 0.8 CT flange bolt	7.5	0.75	5.4	
Crankcase	M5 x 0.8 CT flange bolt	7.5	0.75	5.4	
Connecting rod cap	M5 x 0.8 flange bolt	6.0	0.6	4.3	
Cylinder head cover bolt	M5 x 0.8 CT flange bolt	6.0	0.6	4.3	
Oil drain bolt	M8 x 1.25 screw	6.5	0.65	4.7	
Flywheel	M10 x 1.5 flange nut	27.5	2.75	20	Apply oil to threads and seat.
Fuel tank	M6 x 1.0 cap nut	8	0.8	5.8	
Clutch stay	M8 x 1.25 flange bolt	22.5	2.25	16	
Clutch shoe bolt	M8 x 1.25 special bolt	15.5	1.55	11	
Ignition coil	M5 x 0.8 CT flange bolt	6.0	0.6	4.3	
Stud bolt	M5 x 0.8 CT flange bolt	6.0	0.6	4.3	
Carburetor joint plate	M5 x 0.8 screw	4.5	0.45	3.3	
Carburetor drain bolt	M4 x 0.7 screw	1.5	0.15	1.1	
Emergency stop switch	M16 x 1.0 hex. nut	3.0	0.3	2.2	
Exhaust pipe	M5 x 0.8 flange bolt	6.0	0.6	4.3	
Gear case	M6 x 1.0 hex. bolt	10	1.0	7	
Anode metal	M6 x 1.0 hex. bolt	10	1.0	7	
Propeller shaft holder	M6 x 1.0 hex. bolt	10	1.0	7	
Cavitation plate	M6 x 1.0 hex. bolt	10	1.0	7	
Oil check bolt	M8 x 1.25 special bolt	3.5	0.35	2.5	
Extension case	M6 x 1.0 flange bolt	12	1.2	9	
Extension separator	M6 x 1.0 hex. bolt	10	1.0	7	
Water pipe	M5 x 0.8 hex. bolt	5.3	0.53	3.8	
Swivel case cap	M8 x 1.25 hex. bolt	24	2.4	17	
Stern bracket	M8 x 1.25 hex. bolt/nut	24	2.4	17	
Under case	M6 x 1.0 flange bolt	13	1.3	9	
Grease nipple	M6 x 1.0	3.0	0.3	2.2	
Steering handle	M8 x 1.25 flange bolt	24	2.4	17	
Throttle housing	M5 x 0.8 screw	4.3	0.43	3.1	
Throttle lever	M6 x 1.0 hex. nut	10	1.0	7	
Throttle arm	M6 x 1.0 hex. nut	10	1.0	7	
Cable holder	M6 x 1.0 flange bolt	8	0.8	6	
Throttle cable	M10 x 1.25 hex. nut	4	0.4	2.9	

- Use standard torque values (P. 2-6) for the fasteners that are not listed in this table.
- CT flange bolt indicates a self-tapping bolt.

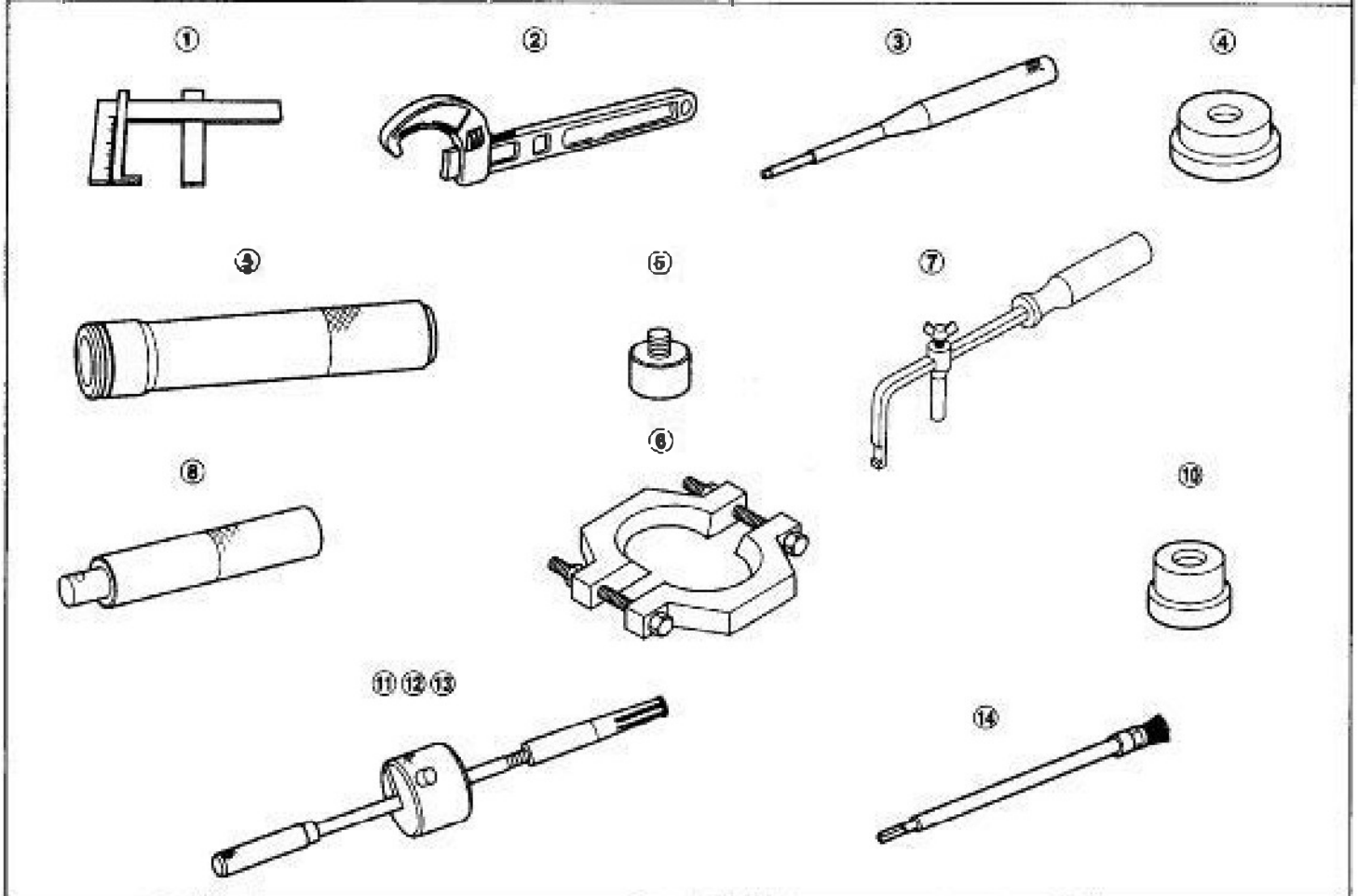
STANDARD TORQUE VALUES

Item	Thread dia.	Tightening torque		
		N·m	kgf·m	lbf·ft
Flange bolt, flange nut	4 mm	3.5	0.35	2.5
	5 mm	5.5	0.55	4.0
	6 mm	10	1.0	7
	8 mm	27	2.7	20
Screw	3 mm	1.0	0.10	0.7
	4 mm	2.1	0.21	1.4
	5 mm	4.3	0.43	3.1
CT flange bolt	5 mm	5.5	0.55	4.0

- CT flange bolt indicates a self-tapping bolt.

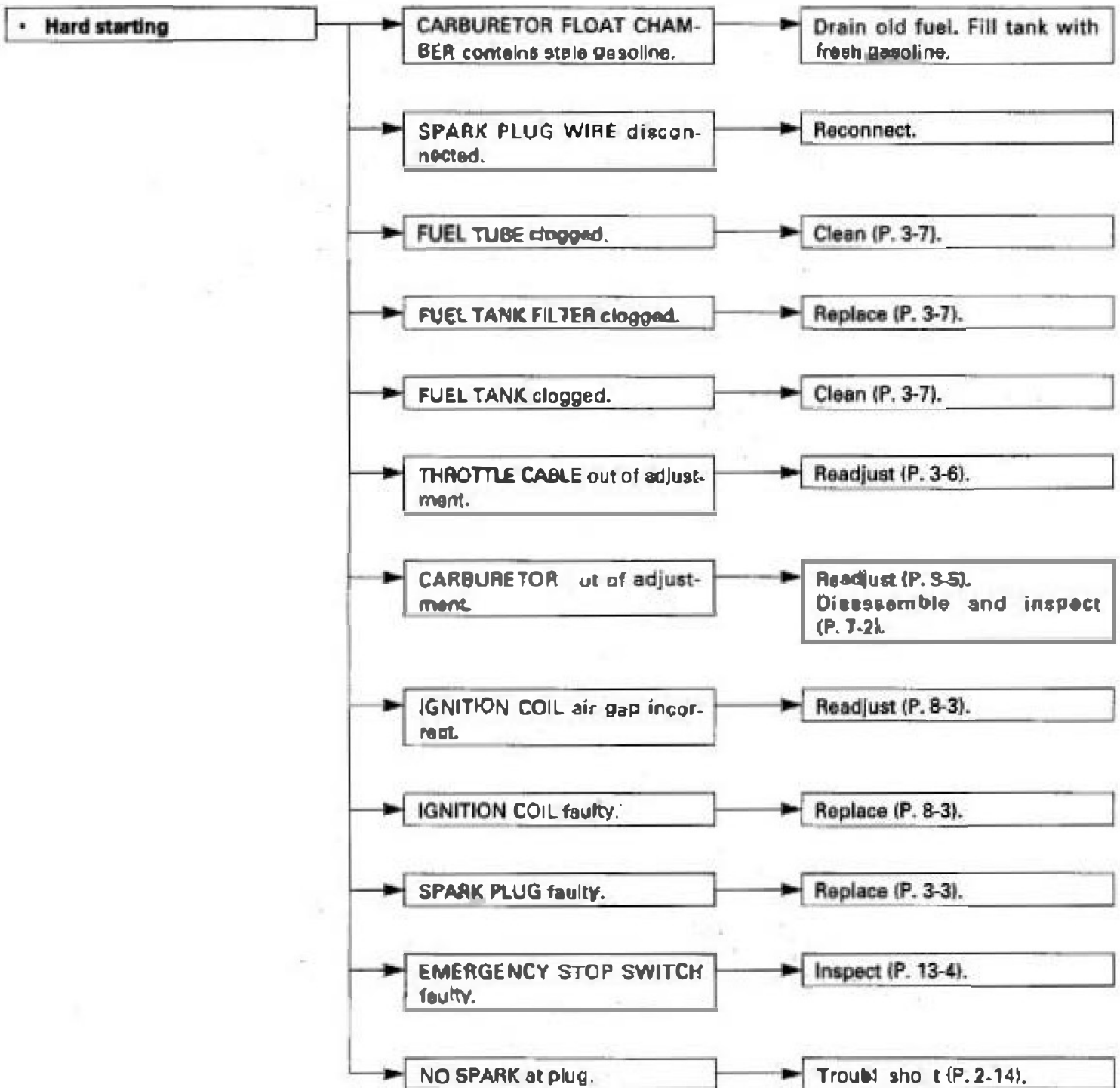
7. SPECIAL TOOLS

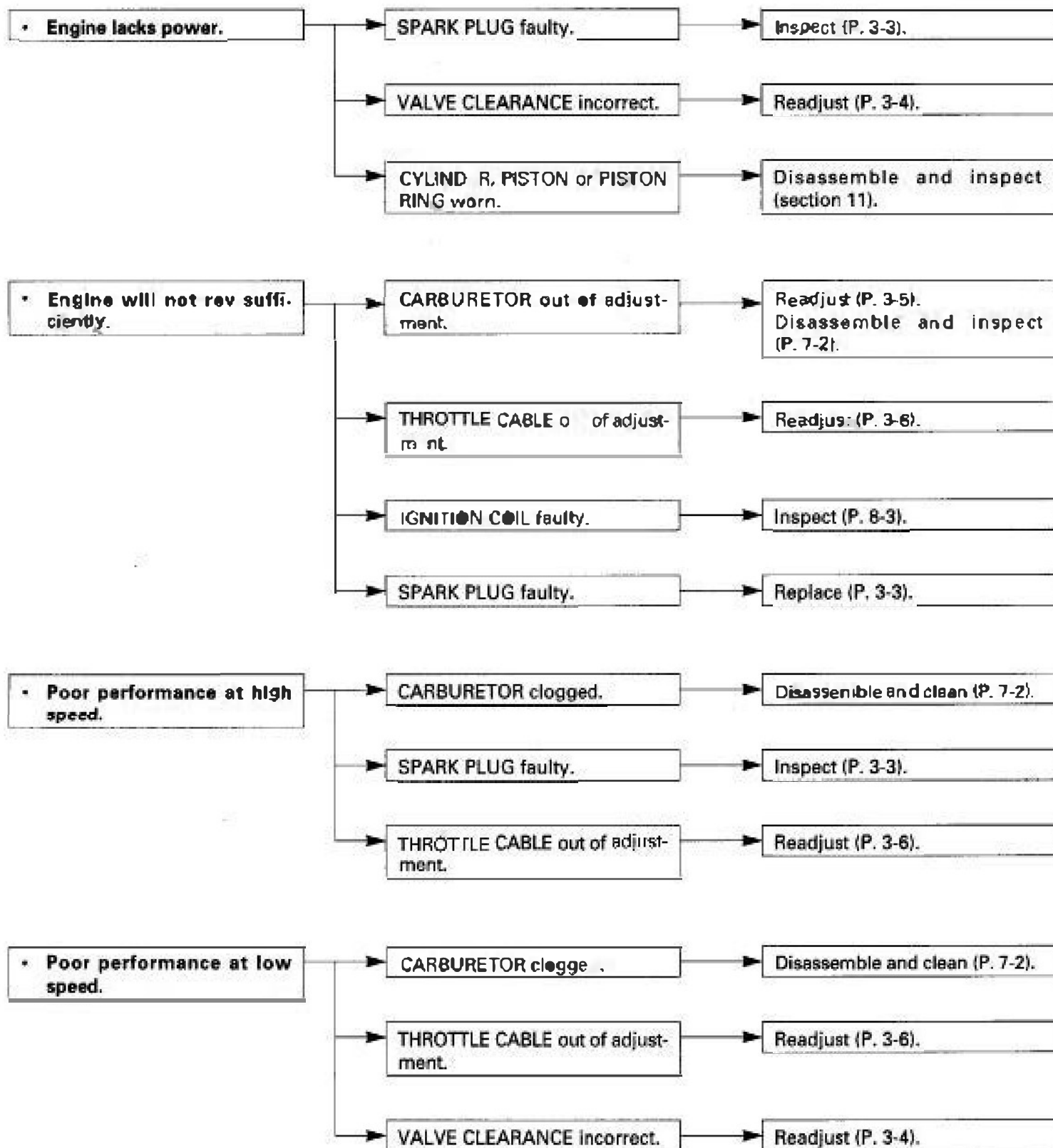
No.	Tool name	Tool number	Application
①	Float level gauge	07401 - 0010000	Carburetor float level inspection
②	Pin spanner	07702 - 0020001	Clutch stay bolt removal/installation
③	Pin driver, 2.5 mm	07744 - 0010100	2.5 mm spring pin removal/installation
④	Outer driver, 24 x 26 mm	07746 - 00107 0	Crankshaft oil seal installation
⑤	Inner driver handle	7746 - 0020100	Gear case bearing installation
⑥	Pilot, 17 mm	07746 - 0040400	Clutch outer bearing installation
⑦	Pilot, 10 mm	07746 - 0040100	Crankshaft oil seal installation
⑧	Oil seal remover	07746 - 0010001	Gear case bearing installation
⑨	Driver handle	07749 - 0010000	Water seal removal
⑩	Bearing separator	07901 - 0010000	Used together with the tools ⑨ and ④ or ⑬
⑪	Oil seal driver attachment	07947 - ZV00100	Clutch outer bearing removal
⑫	Bearing remover shaft	07936 - GE00100	Water seal installation
⑬	Bearing remover head, 10 mm	07936 - GE00200	
⑭	Sliding weight	07741 - 0010201	Gear case bearing removal
⑮	Cleaning brush	07998 - VA20100	Combustion chamber cleaning



8. TROUBLESHOOTING

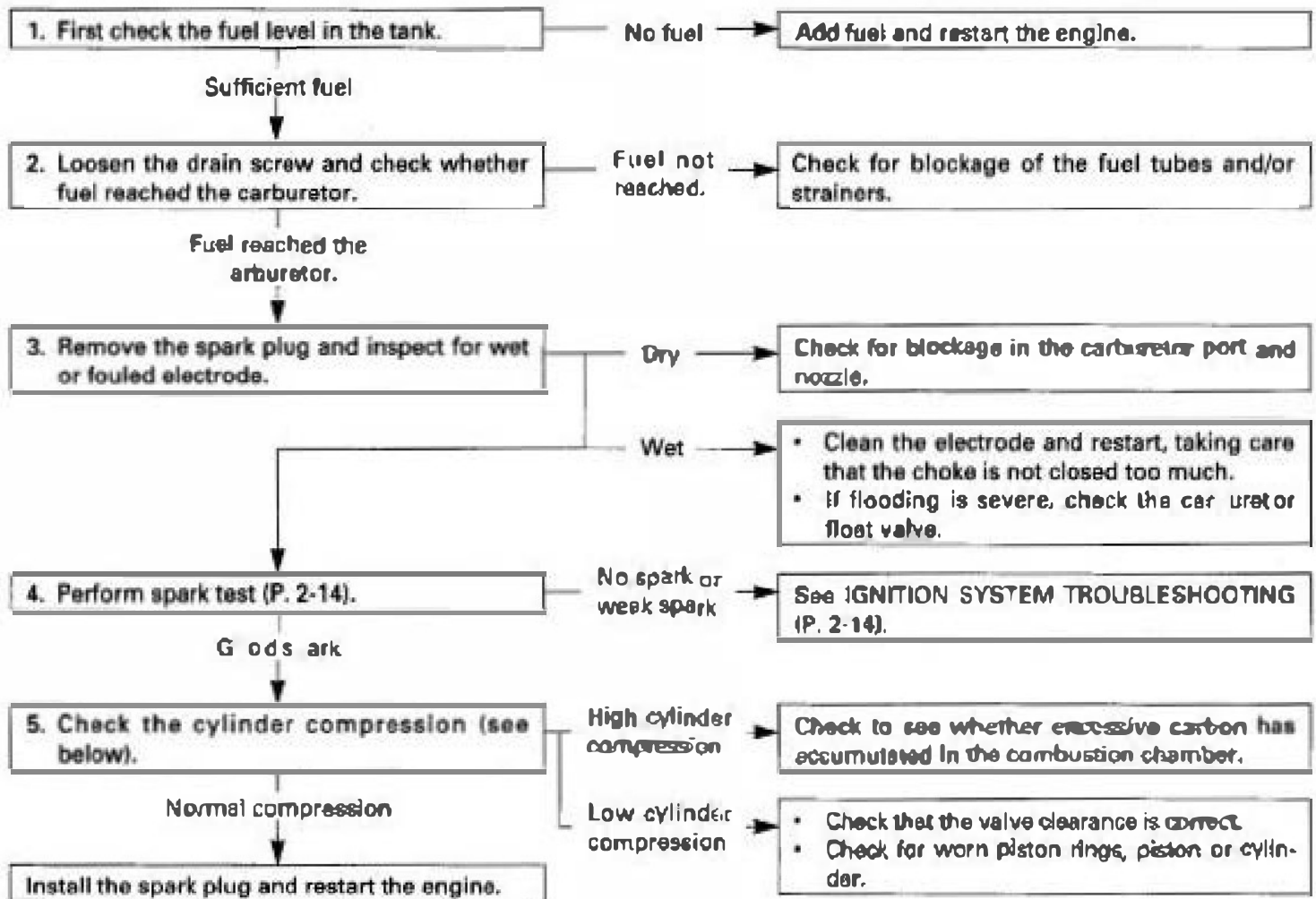
8. GENERAL SYMPTOMS AND POSSIBLE CAUSES





b. ENGINE

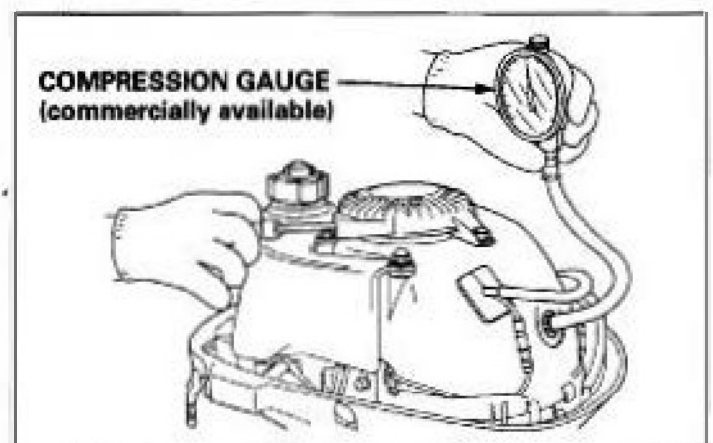
• Hard Starting



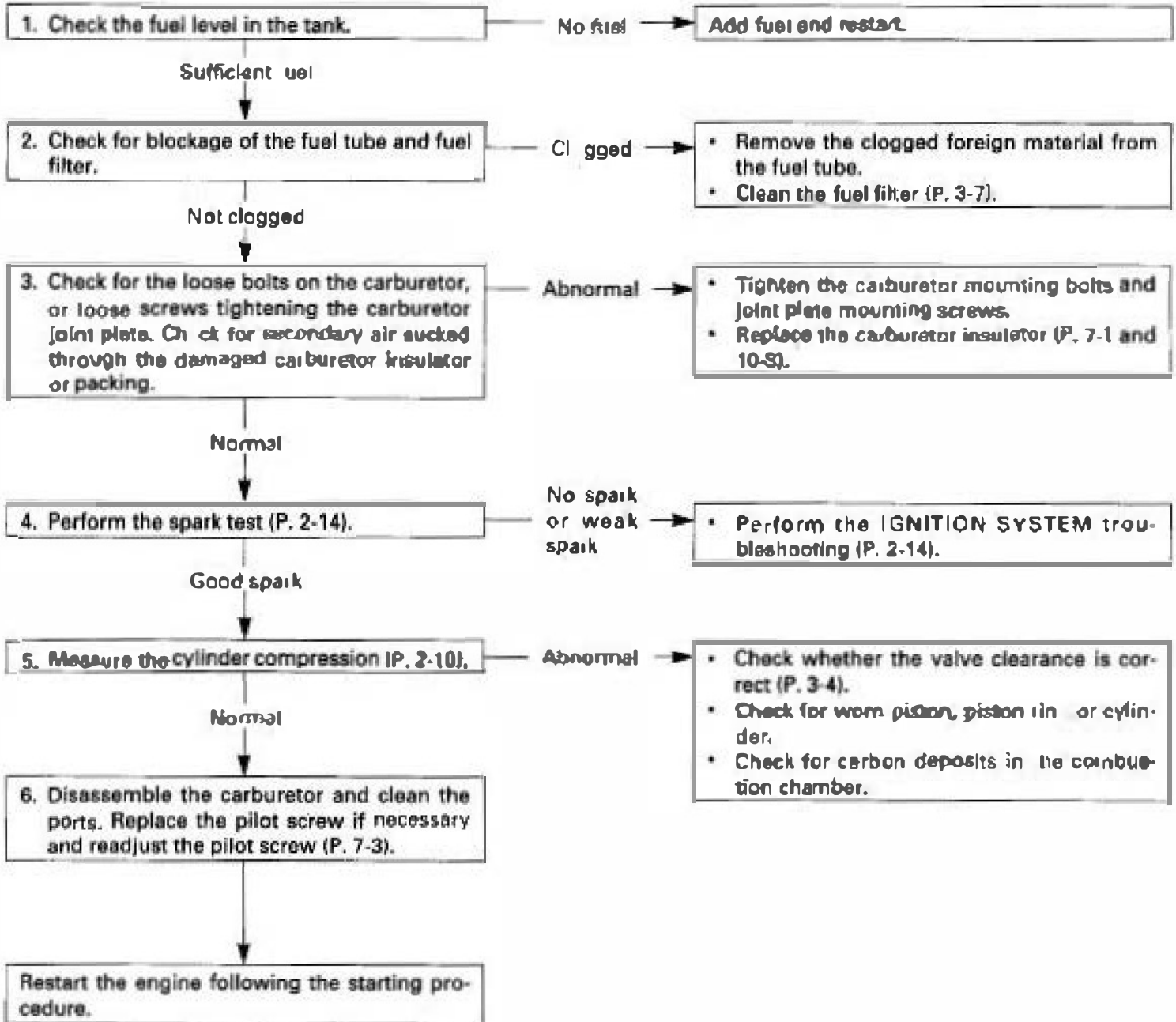
• CYLINDER COMPRESSION CHECK

- 1) Remove the engine cover (P. 4-1).
- 2) Remove the spark plug and install a compression gauge in the spark plug hole.
- 3) Pull the recoil starter several times with force and measure the cylinder compression.

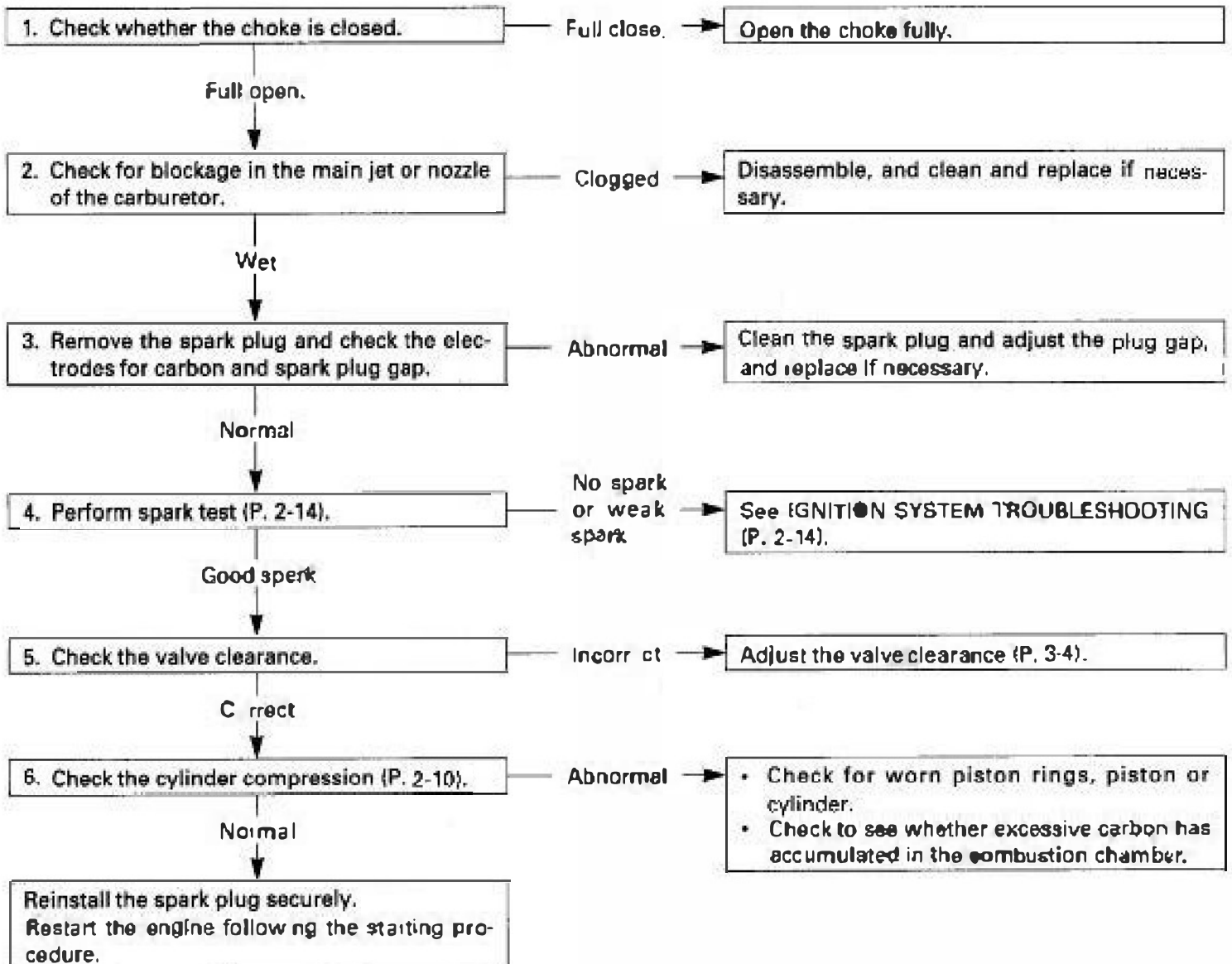
Cylinder compression	0.88 MPa (9.0 kgf/cm ² , 128 psi) at 1,000 rpm
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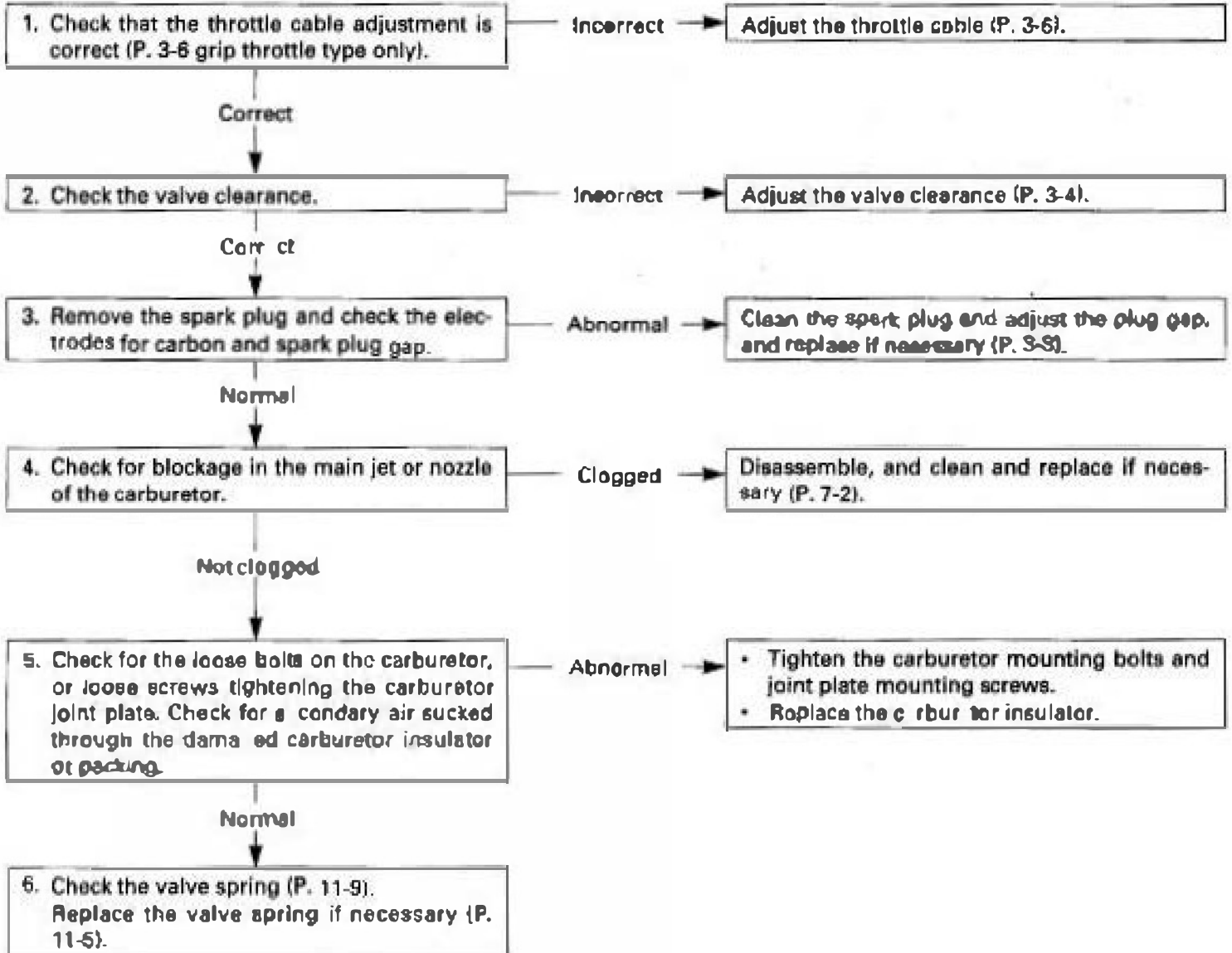
• Engine Starts But Then Stalls



• Engine Lacks Power



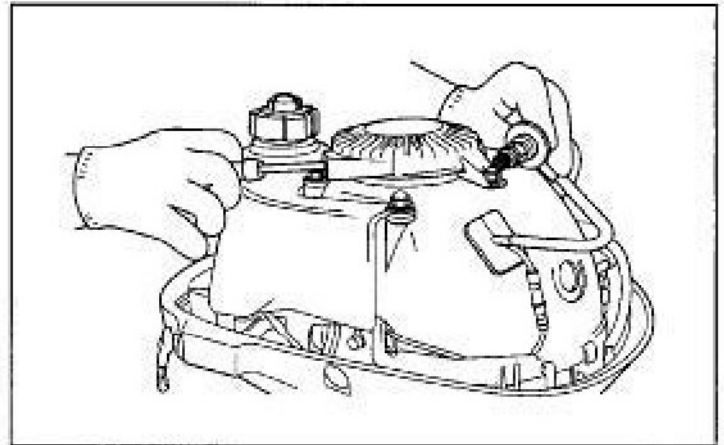
• Engine Speed Does Not Increase



• SPARK TEST

⚠ WARNING

- Do not pull the recoil starter rope while touching the high tension wire. High voltage generates, which is very dangerous. Be sure to ground the spark plug and hold the plug cap to perform the spark test.
- Gasoline is extremely flammable and explosive. If ignited, gasoline can burn you severely. Be sure there is no spilled fuel near the engine.
- Unburnt gas can ignite if it is left in the cylinder. Be sure to drain the carburetor thoroughly before spark test, and release the unburnt gas from the cylinder by pulling the recoil starter several times.



- 1) Remove the engine cover (P. 4-1) and remove the spark plug cap. Clean any dirt from around the spark plug base, then remove the spark plug.
- 2) Loosen the carburetor drain screw to drain the carburetor thoroughly. Pull the recoil starter several times to release the unburnt gas from the cylinder.
- 3) Install the spark plug in the plug cap.
- 4) Make sure that the emergency stop switch clip is engaged with the emergency stop switch.
- 5) Ground the side electrode against the recoil starter mounting cap nut as shown, pull the recoil starter and check to see if sparks jump across the electrodes.

c. IGNITION SYSTEM

1. Measure the spark plug gap and perform the spark test.

Plug gap:
0.6 - 0.7 mm (0.024 - 0.028 in)

No spark

2. Check again after replacing with a new spark plug.

Sparks

Faulty spark plug.

- Replace the spark plug.

No spark

3. Check the insulation of the high tension wire for damage causing current leakage.

Damaged
Insulation

Replace the ignition coil (P. 8-1).

No spark

4. Disconnect the black wire from the emergency stop switch and retest.

Sparks

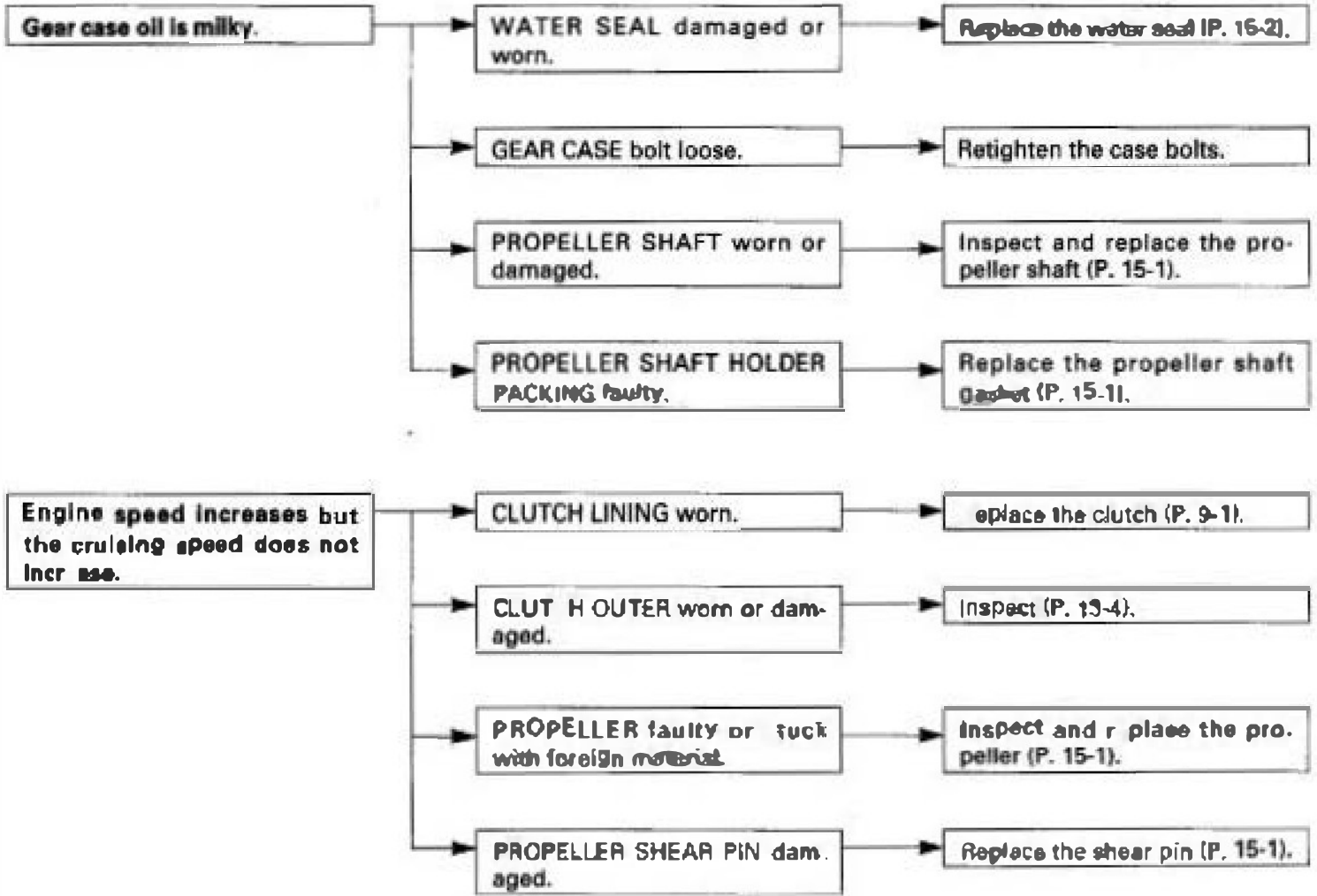
Faulty emergency stop switch.

- Replace the emergency stop switch (P. 13-2).

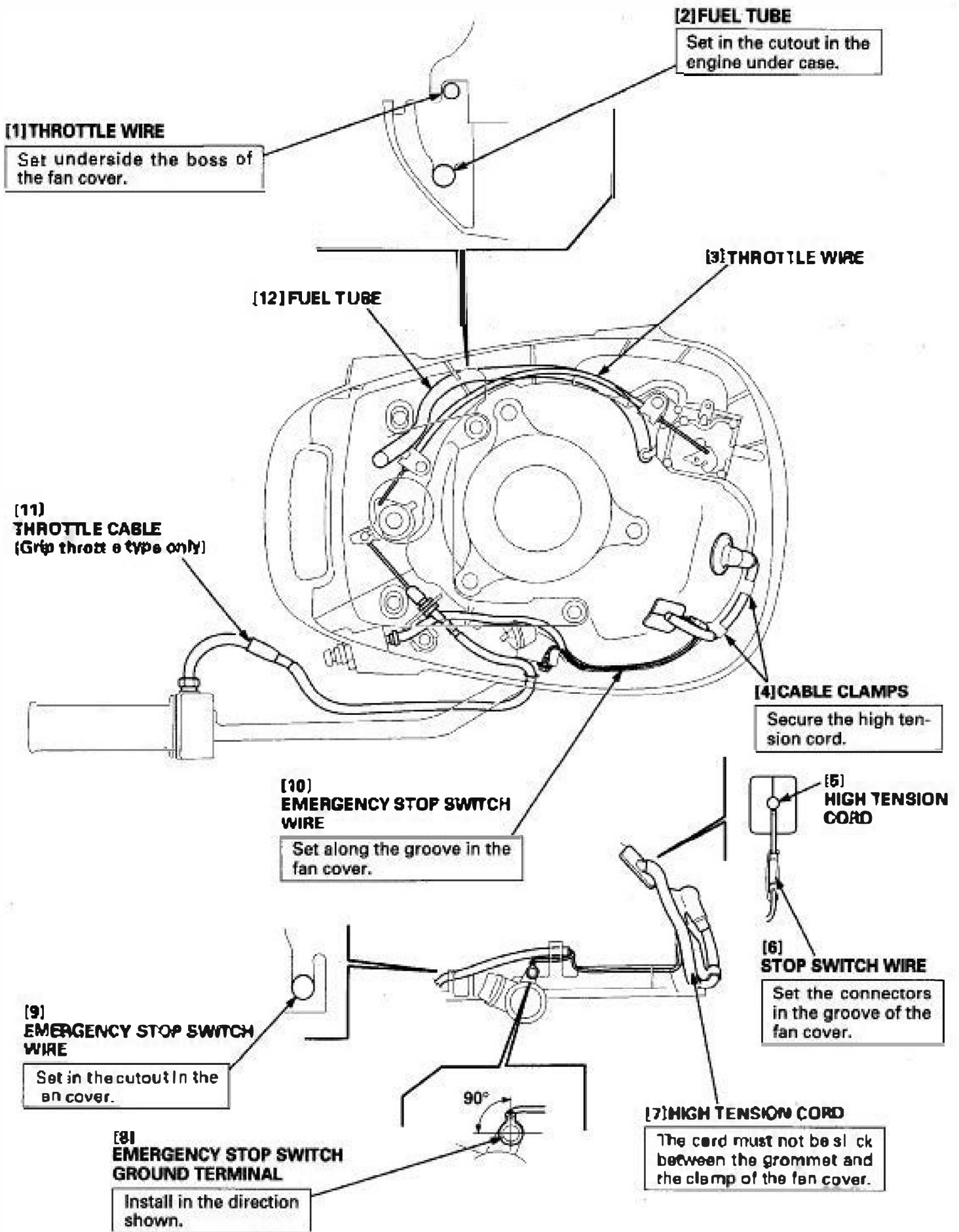
No spark

Faulty ignition coil.
• Replace the ignition coil.

d. LOWER UNIT



9. CABLE & HARNESS ROUTING



3. MAINTENANCE

HONDA
BF20

1. MAINTENANCE SCHEDULE
2. ENGINE OIL
3. GEAR CASE OIL
4. SPARK PLUG
5. VALVE CLEARANCE

6. CARBURETOR
7. THROTTLE CABLE (SH, SCH, LH, LCH type)
8. FUEL FILTER / FUEL TANK / FUEL LINE
9. LUBRICATION POINTS

1. MAINTENANCE SCHEDULE

ITEM	REGULAR SERVICE PERIOD (2) Perform at every indicated month or operating hour intervals, whichever comes first.	Each use	First	Every	Every	Ref. page
			month or 10 Hrs.	5 months or 50 Hrs.	year or 150 Hrs.	
Engine oil	Check level	○				3-2
	Change		○	○		
Gear case oil	Check level			○		3-3
	Change		○		○	
Starter rope	Check			○		5-2
Idle speed	Check-Adjust			○		3-6
Valve clearance	Check-Adjust				○	3-4
Clutch shoe and drum (SC, LC, SCH, LCH type)	Check				●	9-2 13-4
Spark plug	Clean-Adjust (Replace if necessary)		●	○		3-3
Propeller and cotter pin	Check	○				15-1
Anode metal	Check	○				14-2
Lubrication	Grease		○ (1)	○ (1)		3-8
Fuel tank and filter	Clean (Replace if necessary)			●		3-7
Fuel line	Check (Replace if necessary)		Every 2 years			3-7
All bolts and nuts	Check tightness		○		○	—
Swivel case liner and bushing	Replace		Every 3 years			14-1, 3
Water seal	Replace		Every 3 years			15-1

NOTE:

(1) Lubricate more frequently when used in salt water.

(2) For professional commercial use, 10 hours of operation to determine proper maintenance interval.

2. ENGINE OIL

Oil Level Check:

- 1) Hold the outboard motor vertical.
- 2) Check the oil level through the inspection window.
- 3) If the oil level is low, remove the oil filler cap and add the engine oil to the upper level. Change the engine oil if it is stale or contaminated with the foreign material.

Recommended oil	SAE 10W-30 API Service Classification SF or SG
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Engine oil is a major factor affecting performance and service life. Use 4-stroke automotive detergent oil.

Use Honda 4-stroke, or an equivalent high detergent, premium quality motor oil certified to meet or exceed U.S. automobile manufacturer's requirements for service classification SG or SF. Motor oils certified SG or SF will show this designation on the container.

Oil Change:

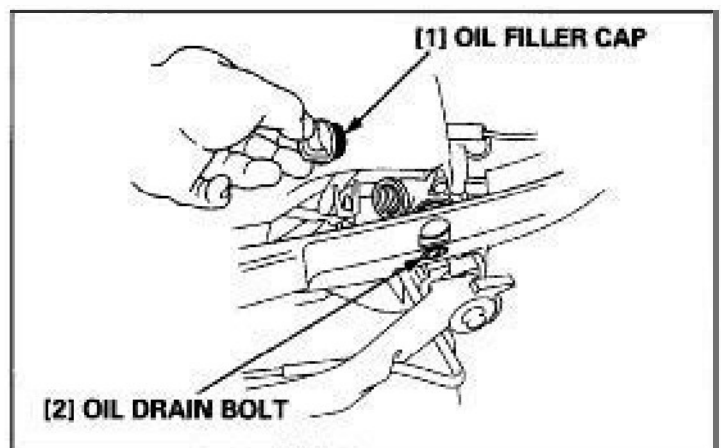
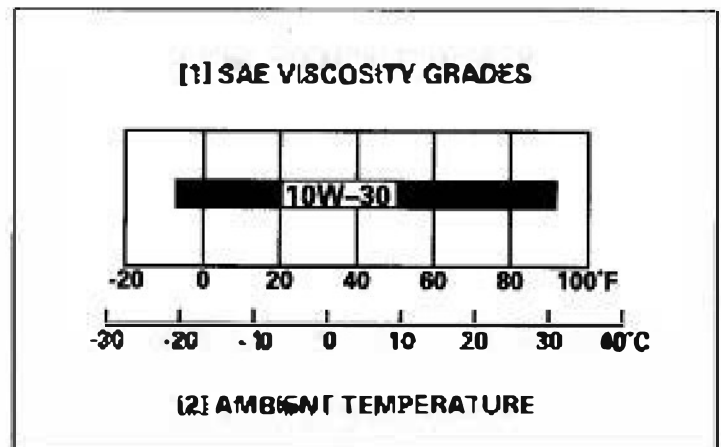
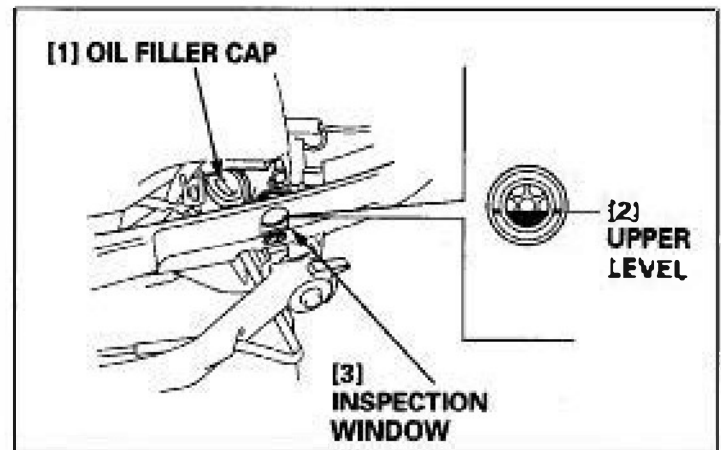
Drain the used oil while the engine is warm. Warm oil drains quickly and completely.

- 1) Be sure that the fuel valve and fuel tank cap are tightened securely.
- 2) Remove the oil filler cap and oil drain bolt. Tilt the motor toward the steering handle side and drain the engine oil into a suitable container.

Please dispose of the used motor oil in a manner that is compatible with the environment. We suggest you take used oil in a sealed container to your local recycling center or service station for reclamation. Do not throw it in the trash, pour it on the ground, or down a drain.

CAUTION

- Used engine oil contains substances that have been identified as carcinogenic.
- If repeatedly left in contact with the skin for prolonged periods, it may cause skin cancer.
- Wash your hands thoroughly with soap and water as soon as possible after contact with used engine oil.



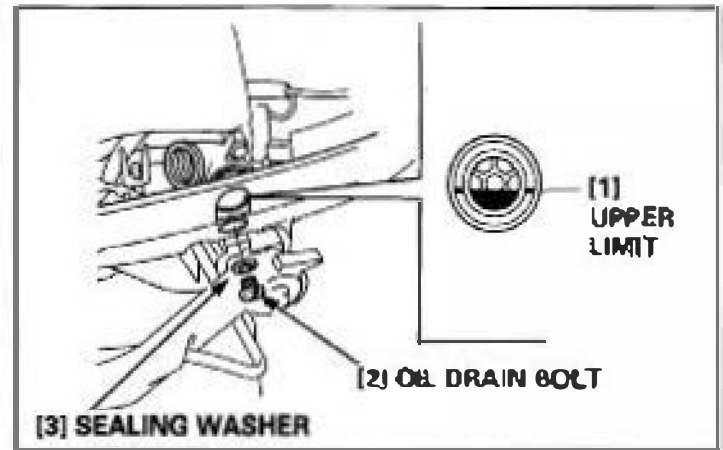
- 3) Return the motor vertical. Install a new sealing washer and oil drain bolt, and tighten the bolt to the specified torque.

TORQUE: 6.5 N·m (0.65 kgf·m, 4.7 lbf·ft)

- 4) Refill with the recommended fresh engine oil to the upper level.

Oil capacity	0.25 l (0.26 US qt, 0.22 Imp qt)
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- 5) Check the oil level again and add to the upper level of the inspection window, if necessary.



3. GEAR CASE OIL

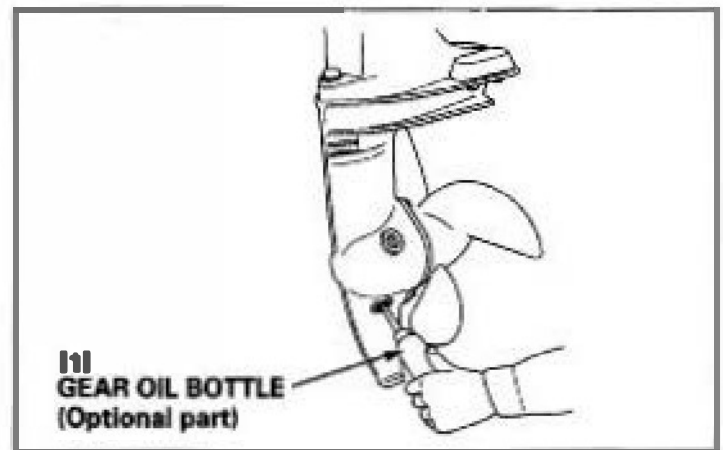
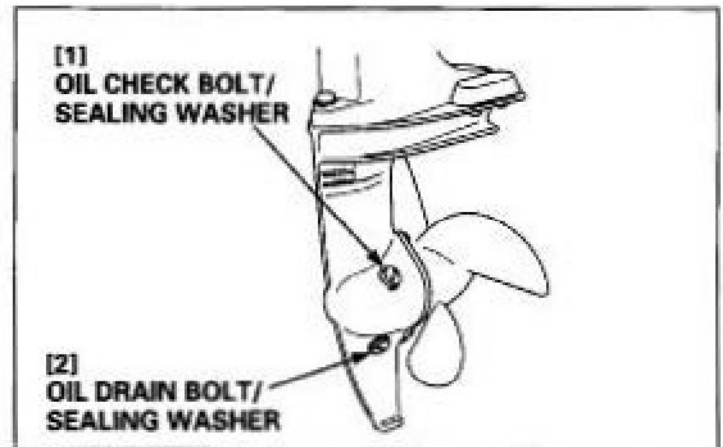
Oil Change:

- 1) Place the outboard motor vertical.
- 2) Remove the oil level check bolt, oil drain bolt and washer, and drain the gear case oil into a suitable container. Check for water in the drained gear case oil. If there is water in the gear case oil, check the gasket and water seal for damage and check torque at each tightening point of the gear case.
- 3) Using the gear oil bottle (optional part) or commercially available oil gun, pour fresh gear oil through the oil drain bolt hole.

Recommended oil	SAE 90 outboard motor gear oil API standard GL-4 or GL-5
Oil capacity	0.05 l (0.05 US qt, 0.04 Imp qt)

- 4) When the oil flows out of the oil level check hole, install a new sealing washer and oil check bolt quickly.
- 5) Then install the oil drain bolt with a new sealing washer.
- 6) Tighten the oil drain bolt and oil check bolt securely.

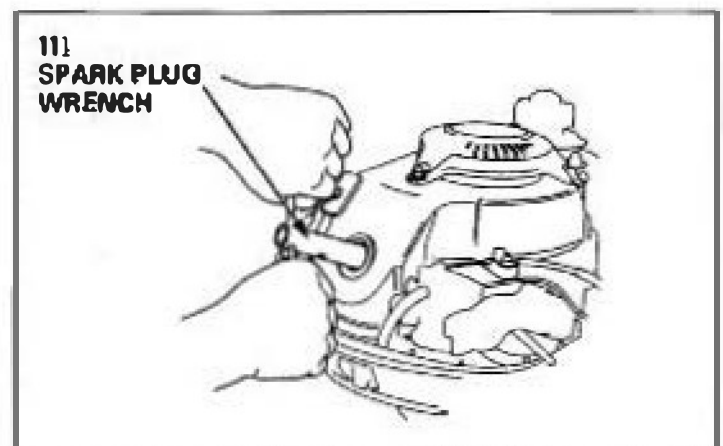
TORQUE: 3.5 N·m (0.35 kgf·m, 3.8 lbf·ft)



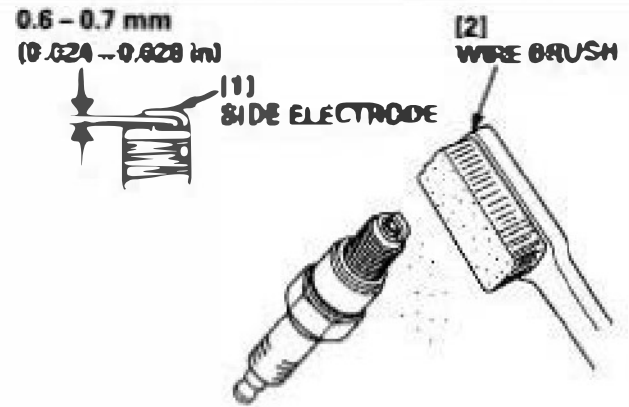
4. SPARK PLUG

Cleaning/Adjustment:

- 1) Remove the engine cover (P. 4-1) and remove the spark plug cap.
- 2) Remove the spark plug using a spark plug wrench.



- 3) Visually inspect the spark plug. Discard the plug if the insulator is cracked or chipped.
- 4) Remove carbon or other deposits with a stiff wire brush.
- 5) Measure the plug gap with a wire-type feeler gauge. If necessary, adjust the gap by bending the side electrode.



Spark plug gap	0.6 - 0.7 mm (0.024 - 0.028 in)
Recommended spark plug	NGK CR5HSB DENSO U16FSR-UB

- 6) Make sure the sealing washer is in good condition; replace if necessary.
- 7) Install the plug fingertight to seat the washer, then tighten with a plug wrench to compress the sealing washer.
 - If reinstalling the used spark plug, tighten 1/8 - 1/4 turn after the spark plug seats.
 - If installing a new spark plug, tighten 1/2 turn after the spark plug seats.

CAUTION

A loose spark plug can become very hot and may damage the engine. Overtightening the spark plug can damage the threads in the cylinder head.

- 8) Reinstall the spark plug cap, and install the engine cover.

5. VALVE CLEARANCE

Valve clearance inspection and adjustment must be performed with the engine cold.

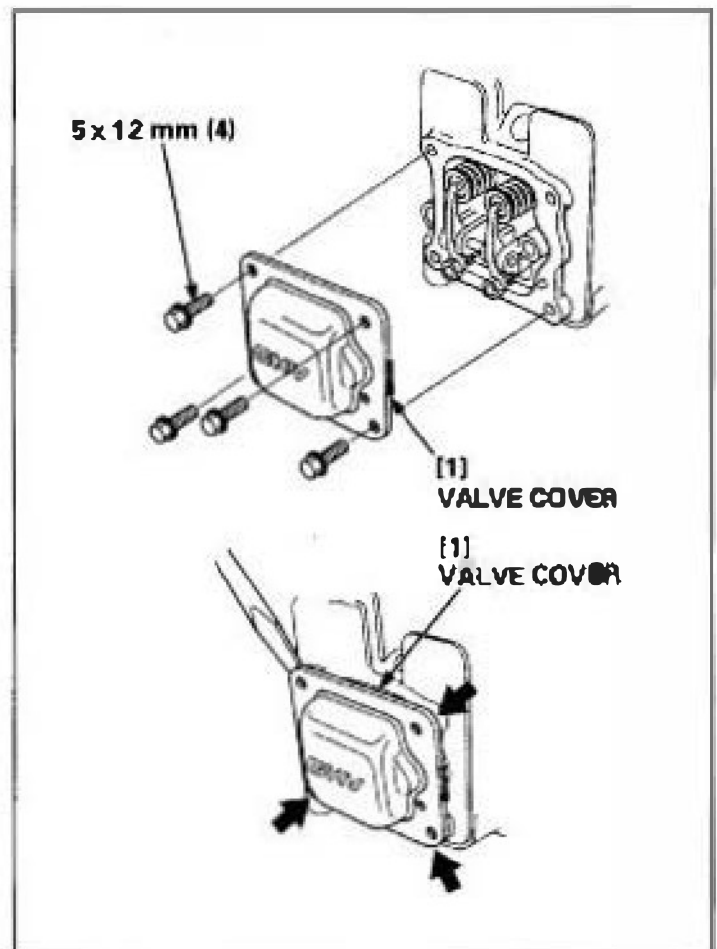
Inspection/Adjustment:

- 1) Remove the engine (P. 6-1).
- 2) Remove the four 5 x 12 mm flange bolts.
- 3) Loosen the valve cover by slightly prying up each corner, then remove the valve cover.

Catch up the spilled engine oil with a shop towel when removing the valve cover.

CAUTION

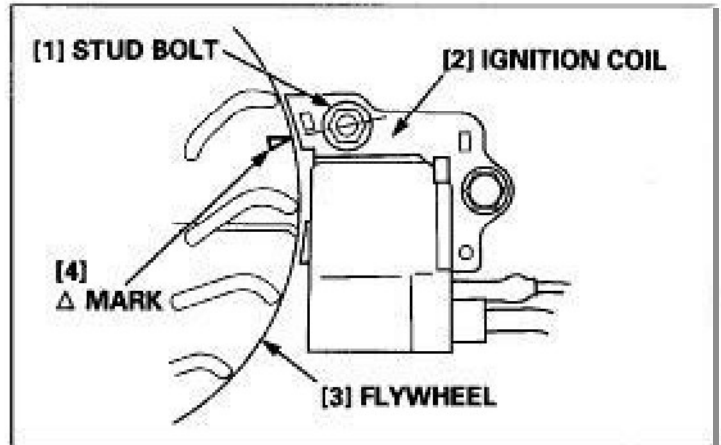
- Do not remove the valve cover with excessive force. It can deform the valve cover.
- Replace the valve cover if it is deformed.



4) Turn the flywheel clockwise and set the piston at top dead center of the compression stroke. (Align the Δ mark on the flywheel with the center of the ignition coil mounting stud bolt as shown.)

- If the exhaust side opens when the mark aligns with the end of the ignition coil installation part, turn the flywheel one turn again and bring the mark to the alignment position.

5) Insert a feeler gauge between the rocker arm and valve, and measure the valve clearance.



Valve clearance	IN	0.06 – 0.10 mm
	EX	0.09 – 0.13 mm

6) If adjustment is necessary, proceed as follows.

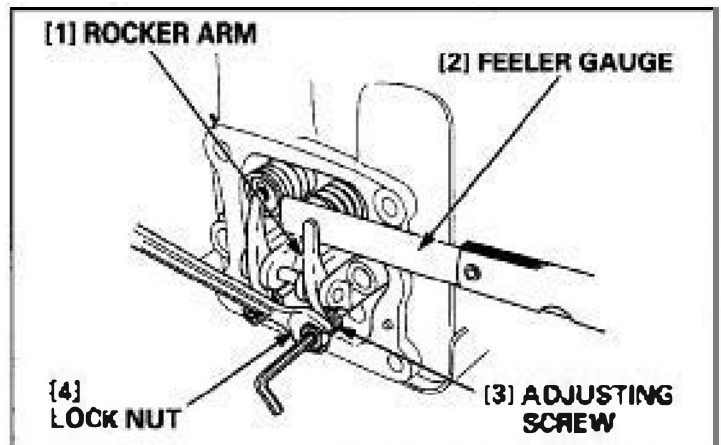
a. Loosen the adjusting screw lock nut and adjust the valve clearance by turning the adjusting screw in or out.

- To increase valve clearance, screw out.
- To decrease valve clearance, screw in.

b. Holding the adjusting screw with the valve adjusting wrench, tighten the lock nut to the specified torque.

TORQUE: 5.5 N·m (0.55 kgf·m, 4.0 lbf·ft)

c. After tightening the lock nut, check the valve clearance again.



7) Install the valve cover (P. 10-2).

8) Reinstall the removed parts in the reverse order of removal.

6. CARBURETOR

CAUTION

- Running the outboard motor for long time without sufficient water will damage the lower unit parts.
- Keep clear of moving parts.

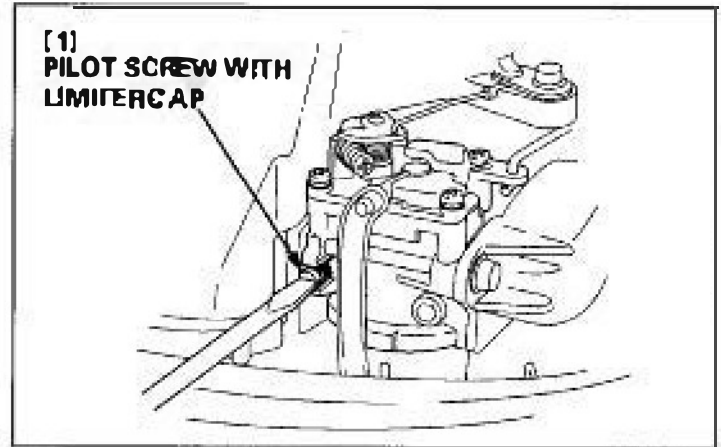
Adjustment:

1) Run the outboard motor in an outboard test tank with the water at least 100 mm (4 in) above the anti-ventilation plate. Allow the engine to warm up to normal operating temperature.

2) Stop the engine and remove the engine cover. Attach an engine tachometer and restart the engine.

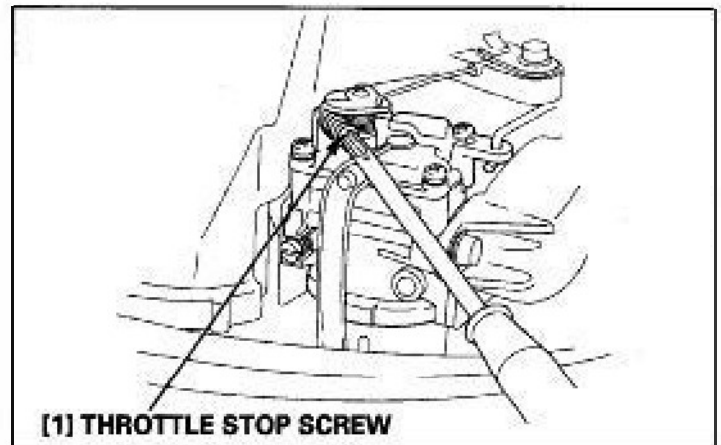
- 3) With the engine idling, turn the pilot screw in or out to the setting that produces the highest idle speed. The correct setting will usually be obtained at approximately the following number of turns out from the fully closed (lightly seated) position.

Standard pilot screw opening	SCG, LCG, SCHG, LCHG type: 2- 1/4 turns out Except SCG, LCG, SCHG, LCHG type: 2 turns out
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- 4) After the pilot screw is correctly adjusted, turn the throttle stop screw to obtain the standard idle speed.

Specified idle speed in neutral	2,000 ± 100 min ⁻¹ (rpm)
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7. THROTTLE CABLE (SH, SCH, LH, LCH type)

Adjustment:

- 1) Check the throttle grip play.

The play must be approximately one graduation from the throttle mark.

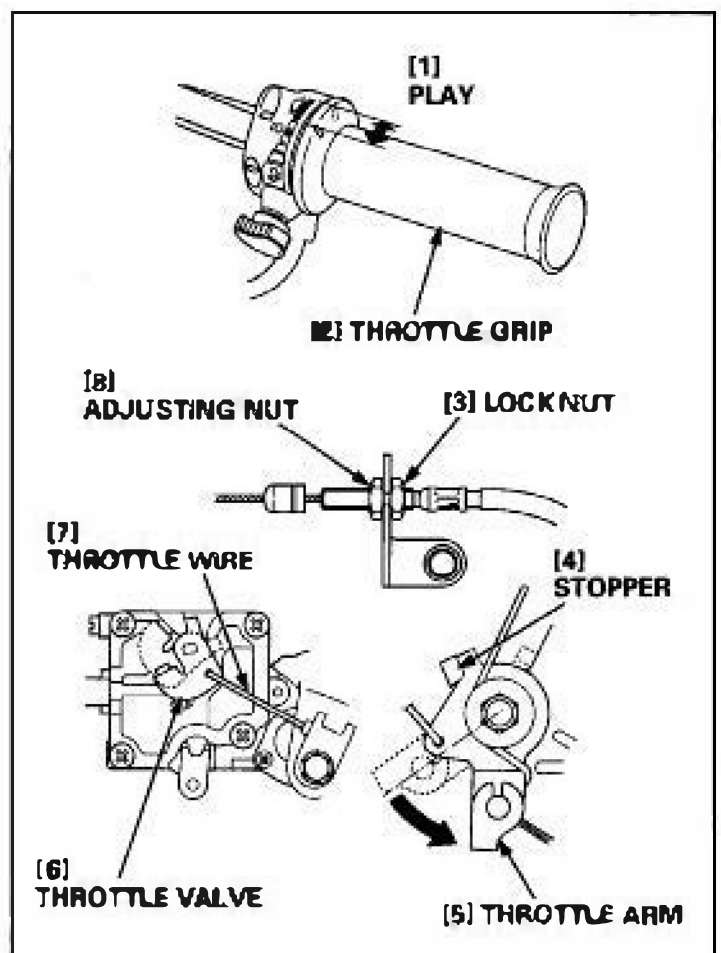
- 2) If adjustment is necessary, adjust by loosening the lock nut and turning the adjusting nut right or left.

- 3) Move the throttle grip to the full open position and check whether the throttle arm contacts the stopper.

If the throttle arm does not contact the stopper, repeat the above steps 1) and 2).

- 4) Check whether the throttle grip moves smoothly and it is linked with the carburetor throttle lever operation. Check to see whether the carburetor throttle lever operates smoothly from the fully close to the full open positions.

If the carburetor throttle valve does not open or close fully, check the throttle wire installation and adjust as needed.



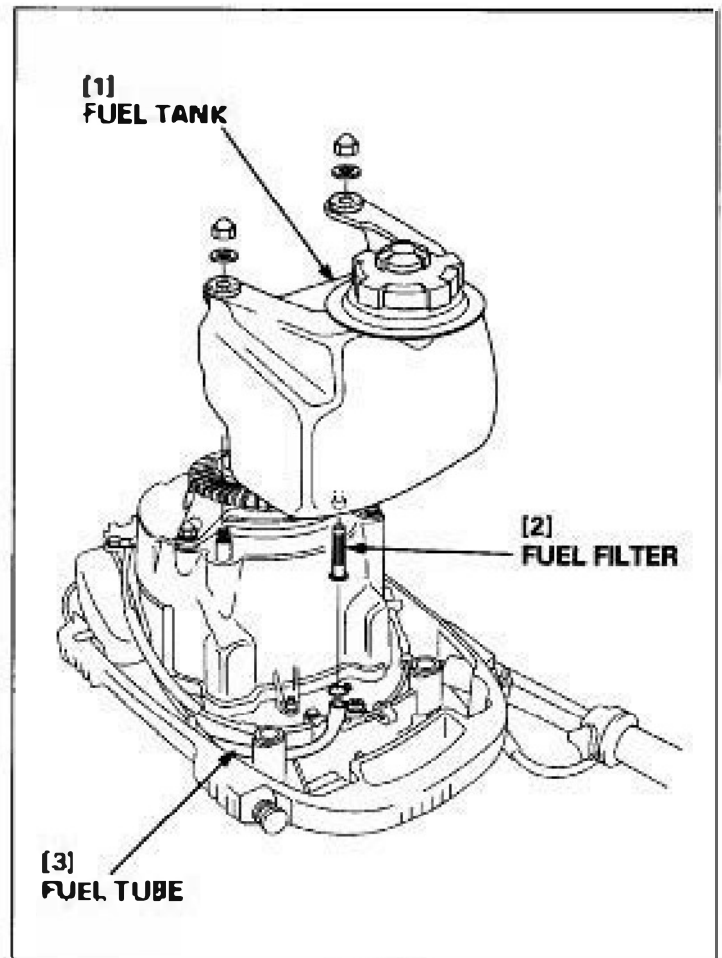
8. FUEL FILTER/FUEL TANK/FUEL LINE

⚠ WARNING

Gasoline is highly flammable and explosive. You can be burned or seriously injured when handling fuel. Keep heat, sparks, and flame away. Wipe up spills immediately.

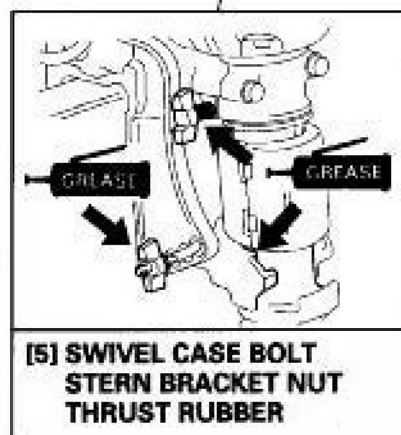
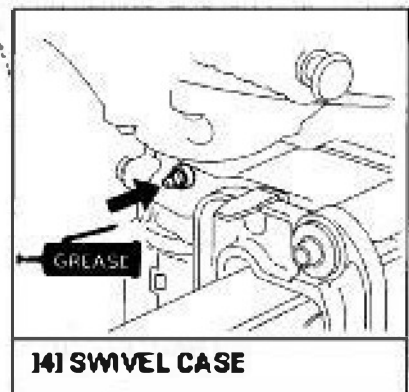
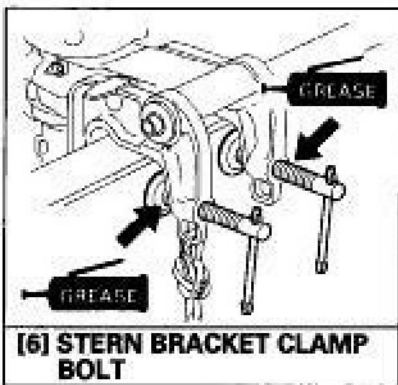
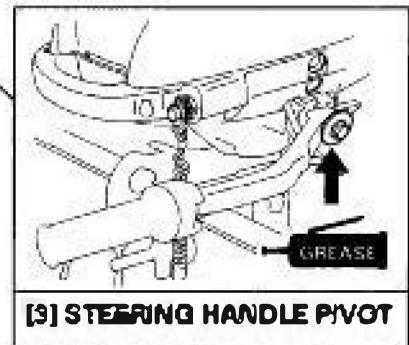
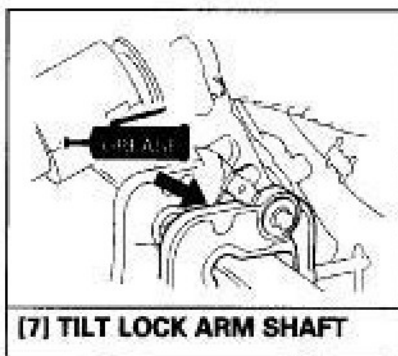
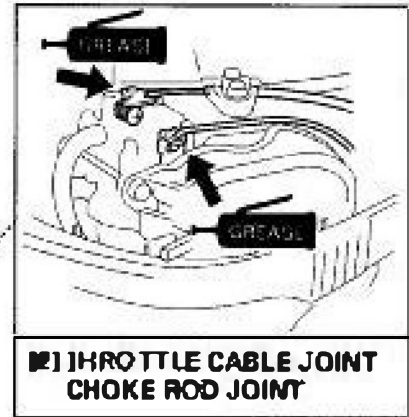
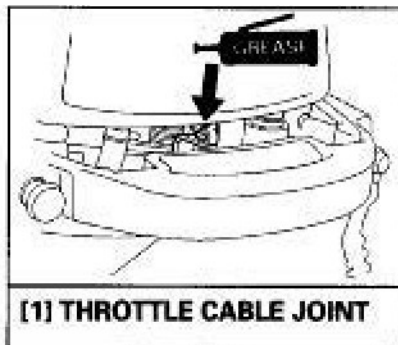
Check/Cleaning

- 1) Drain the fuel into a suitable container.
- 2) Remove the engine cover (P. 4-1).
- 3) Remove the fuel tank and disconnect the fuel tank tube.
- 4) Remove the fuel filter.
- 5) Remove the clogged foreign material from the fuel filter, and check the fuel filter for damage. Replace the filter if necessary.
- 6) Clean the fuel tank with cleaning solvent and allow the fuel tank to dry thoroughly.
- 7) Check the fuel tube for deterioration, cracks, and other damage. Replace if necessary.
- 8) After cleaning, set the fuel filter in the fuel tank and connect the fuel tank tube.
- 9) Insert the fuel tank tube as deep as to the base of the tank joint securely (P. 4-2).
- 10) Install the fuel tank and check to see whether the fuel is not leaking from the fuel tank tube.
- 11) Install the engine cover.



9. LUBRICATION POINTS

Apply marine anti-corrosion grease to the parts shown below.



4. ENGINE COVER/FUEL TANK

HONDA
BF2D

1. ENGINE COVER

2. FUEL TANK

1. ENGINE COVER

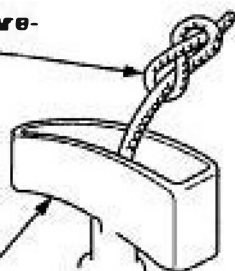
a. REMOVAL/INSTALLATION

[1] STARTER GRIP

REASSEMBLY:

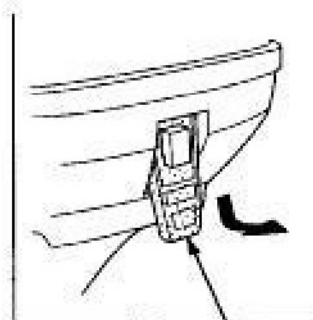
Pass the rope end through the starter grip and make a figure-eight knot at the rope end as shown.

[1]-1
Make a figure-eight knot.

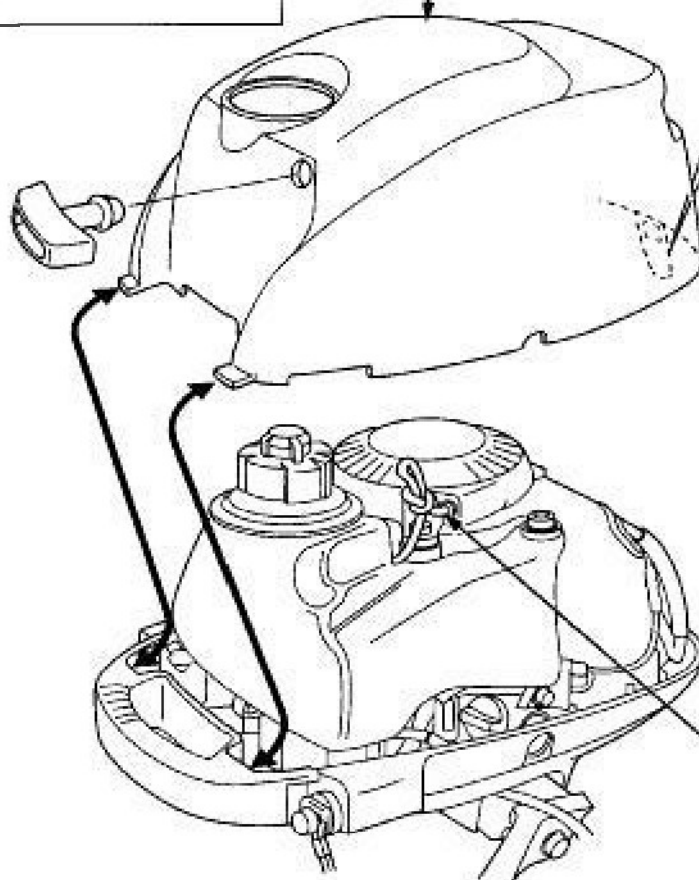


[1]-2
STARTER GRIP

[2]
ENGINE COVER



[3]
ENGINE COVER LOCK BAND



[4]
STARTER ROPE

REMOVAL:

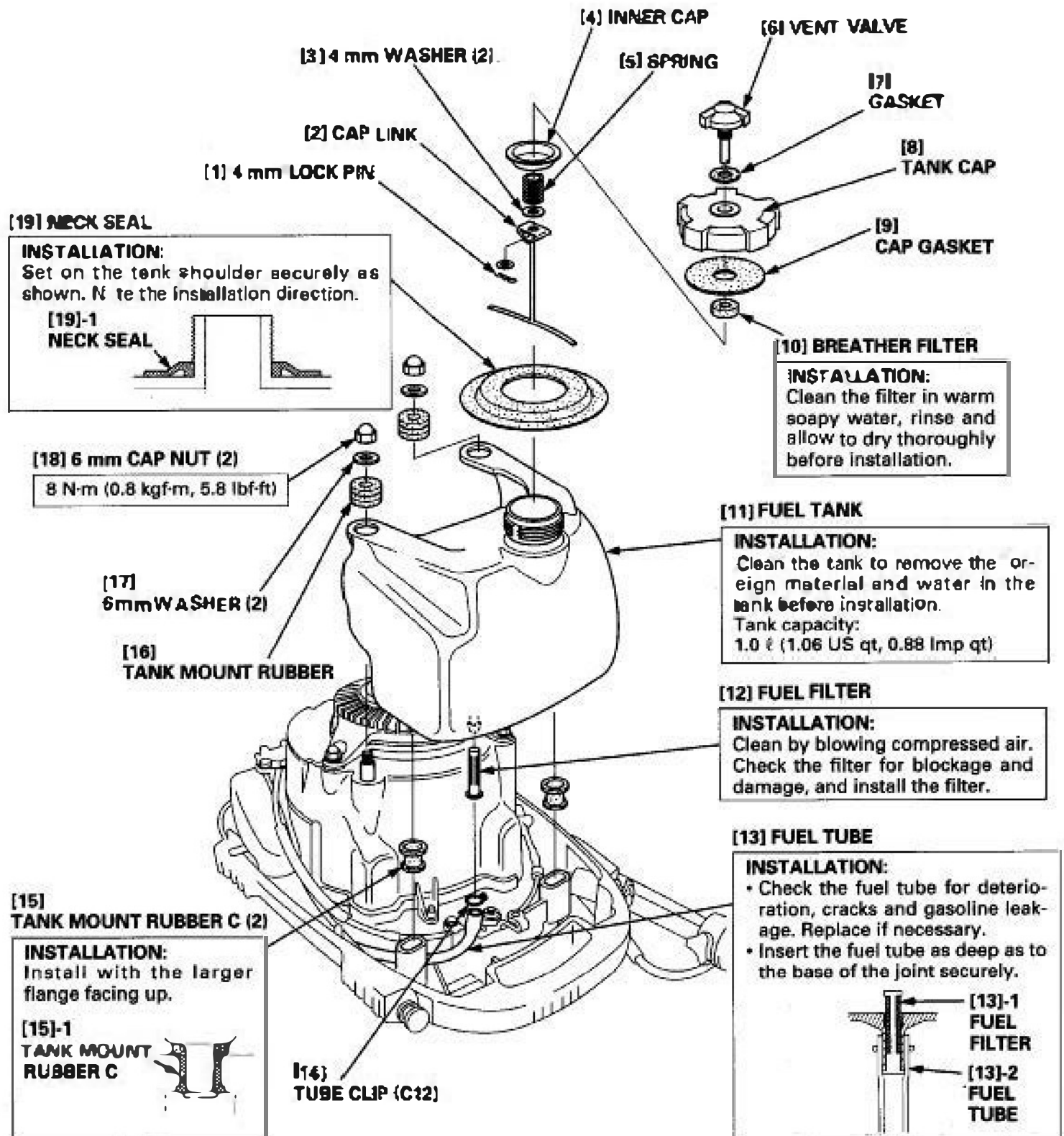
To prevent the starter rope from rewinding, make a knot in the rope at the recoil starter.

2. FUEL TANK

a. DISASSEMBLY/REASSEMBLY

WARNING

- Gasoline is highly flammable and explosive. You can be burned or seriously injured when handling fuel. Keep heat, sparks, and flame away. Wipe up spills immediately.
- Drain the fuel tank thoroughly before removing the fuel tank.



5. RECOIL STARTER/FAN COVER

HONDA
BF20

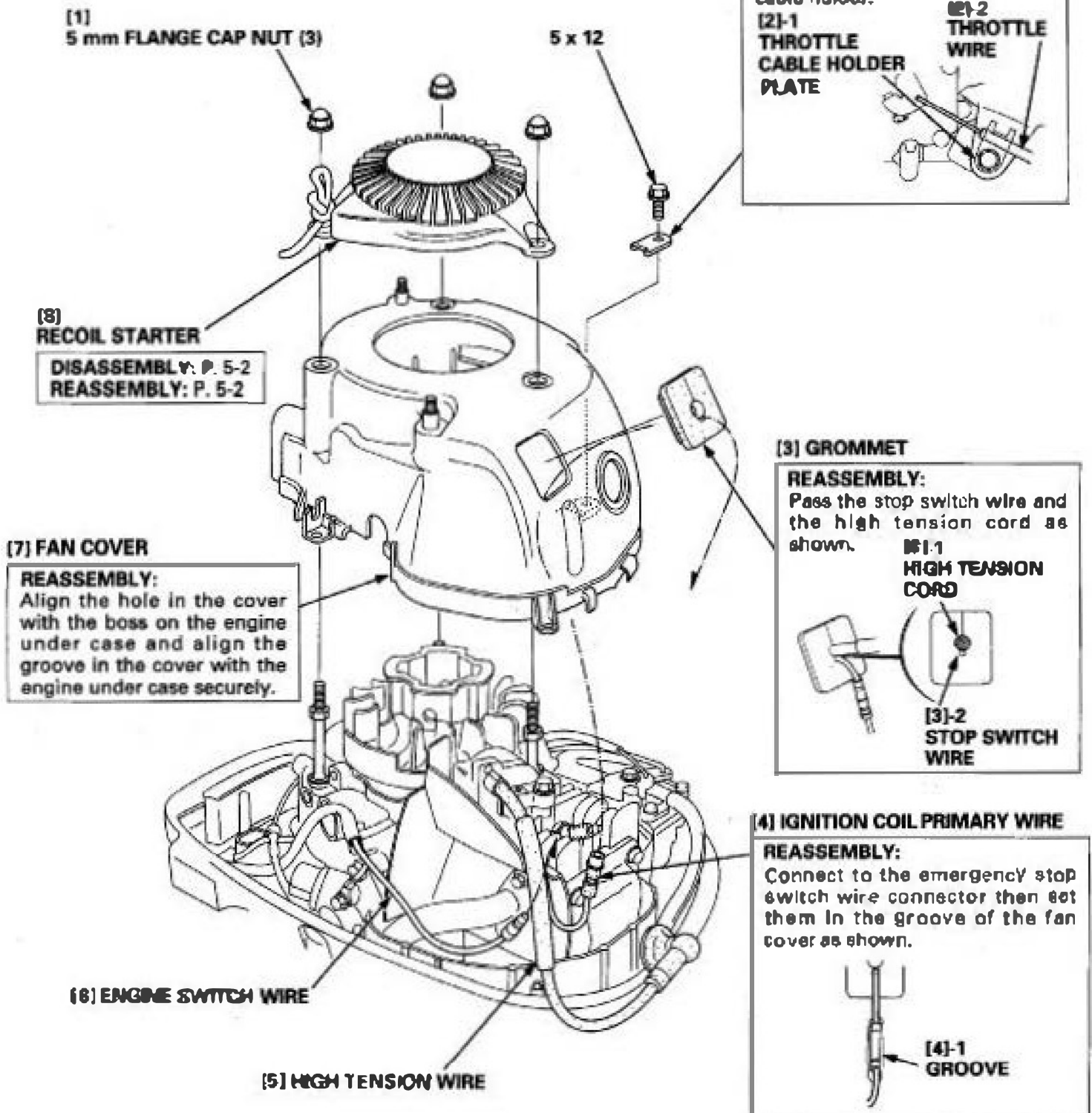
1. FAN COVER

2. RECOIL STARTER

1. FAN COVER

a. REMOVAL/INSTALLATION

- 1) Remove the engine cover (P. 4-1).
- 2) Remove the fuel tank (P. 4-2).
- 3) Remove the spark plug cap.
- 4) Disconnect the engine switch wire.



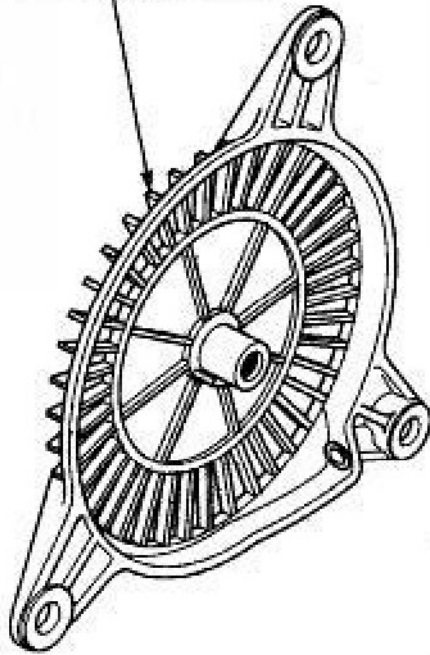
2. RECOIL STARTER

a. DISASSEMBLY

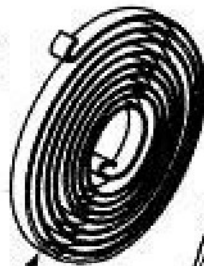
CAUTION

- Wear heavy gloves during operation.
- Take care not to allow the recoil starter spring to pop out.

[1] RECOIL STARTER CASE



[2] STARTER REEL



[3] RECOIL STARTER ROPE

Check for fraying and wear, and replace if necessary.



[4] RATCHET (2)



[5] FRICTION PRING RING



[8] RECOIL STARTER SPRING

DISASSEMBLY:

Wear gloves during operation. Take care not to allow the recoil starter spring to pop out.

[7] RATCHET GUIDE



[6] SET SCREW



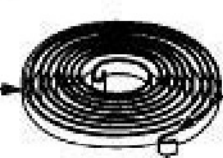
b. REASSEMBLY

CAUTION

- Wear heavy gloves during operation.
- Take care not to allow the recoil starter spring to pop out.

- 1) Set the hook at the outer end of the recoil starter spring in the groove in the starter reel, and wind the starter spring around the starter reel.

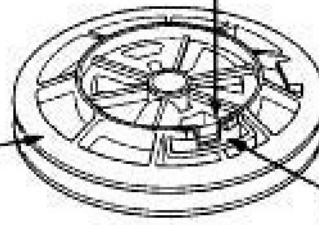
[1] RECOIL STARTER SPRING



[2] HOOK



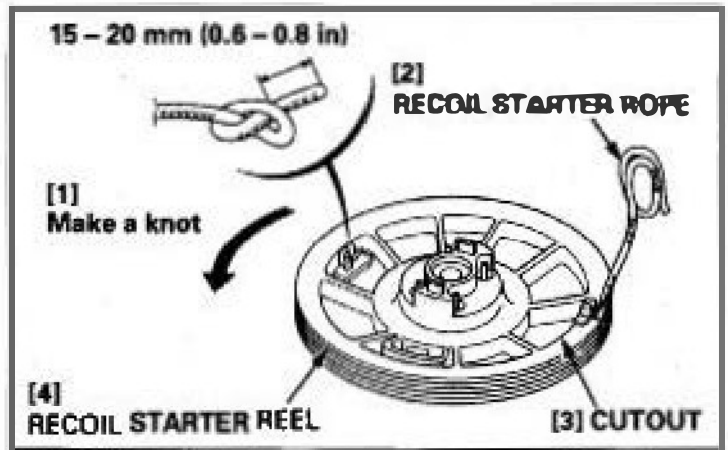
[4] RECOIL STARTER REEL



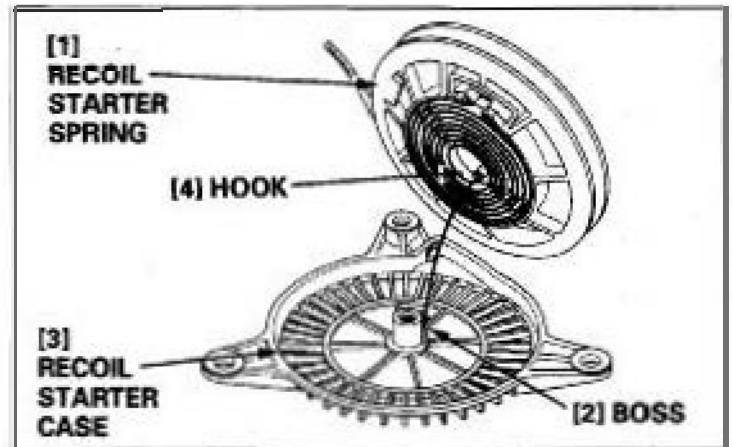
[3] GROOVE

- 2) Pass the starter rope through the rope hole in the reel and make a knot at the rope end as shown.

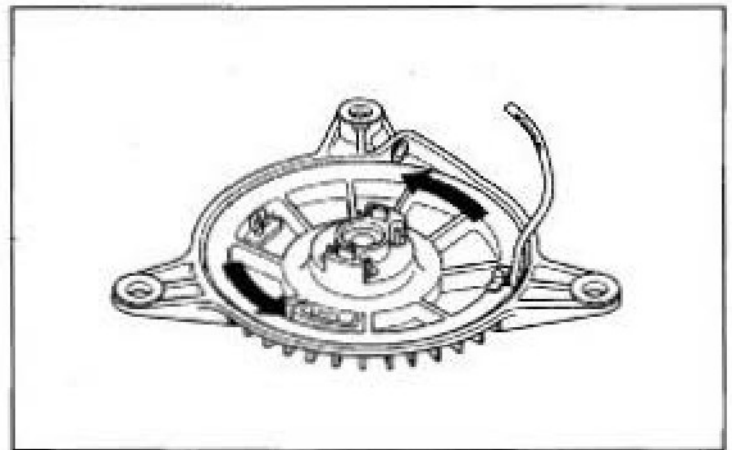
Wind the rope around the recoil starter reel in the direction of the arrow. Leave approximately 20 cm (8 in) of the starter rope unwound. It must be out of the cutout in the starter reel.



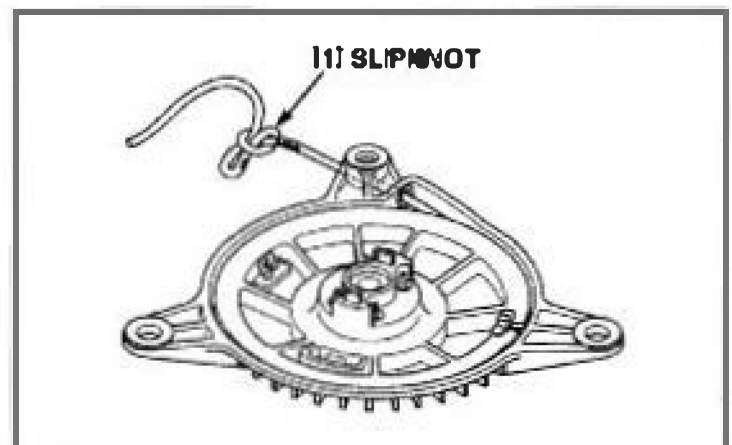
- 3) Install the reel in the case so that the hook at the inner end of the recoil starter spring sets on the boss of the case.



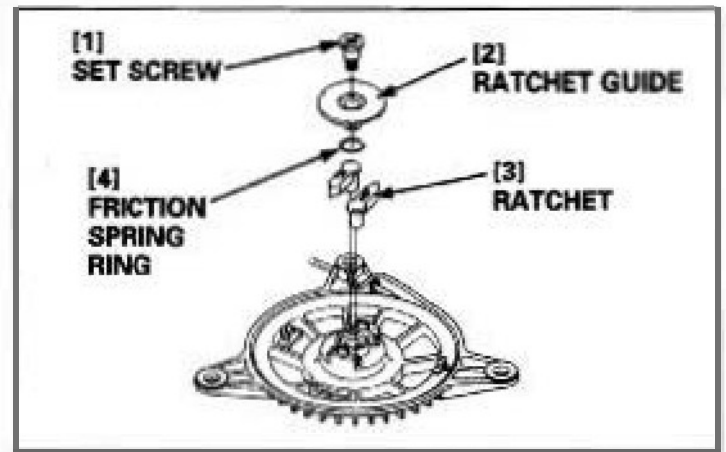
- 4) With the starter rope end out of the cutout in the reel, turn the starter reel approximately 3 turns in the direction of the arrows to preload the spring.



- 5) Pull out the rope end from the hole in the case, and make a slipknot in the rope to prevent the rope from rewinding.



- 6) Install the ratchet in the position shown.
- 7) Set the friction spring ring and set screw in the ratchet guide. Holding the ratchet guide, tighten the set screw securely.
- 8) Pull the starter rope several times and check whether the ratchet moves smoothly.



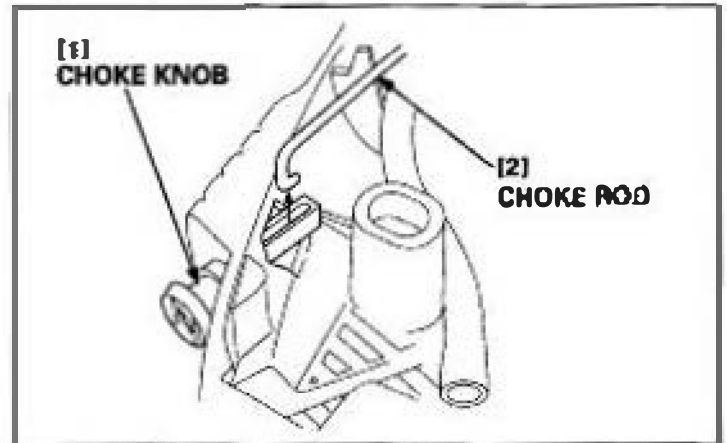
1. ENGINE REMOVAL

2. ENGINE INSTALLATION

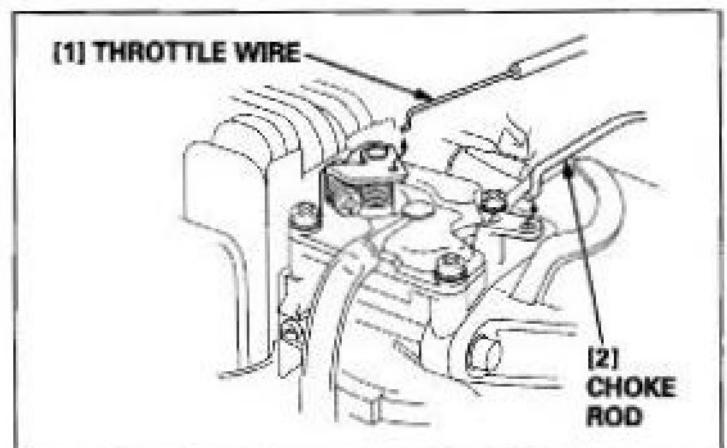
1. ENGINE REMOVAL

- 1) Remove the engine cover (P. 4-1), and remove the following parts.
 - Fuel tank (P. 4-2)
 - Recoil starter (P. 5-1)
 - Fan cover (P. 5-1)

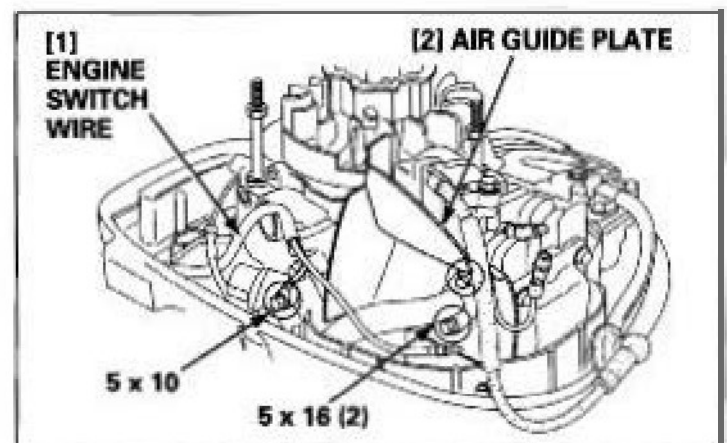
- 2) Push in the choke knob and disconnect the choke rod.



- 3) Disconnect the choke rod and throttle wire from the carburetor.



- 4) Remove the 5 x 16 mm flange bolts. Disconnect the exhaust pipe from the engine and remove the air guide plate.
- 5) Remove the 5 x 10 mm flange bolt and disconnect the engine switch ground terminal.
- 6) Remove the 6 x 60 flange bolts and washers and remove the engine.

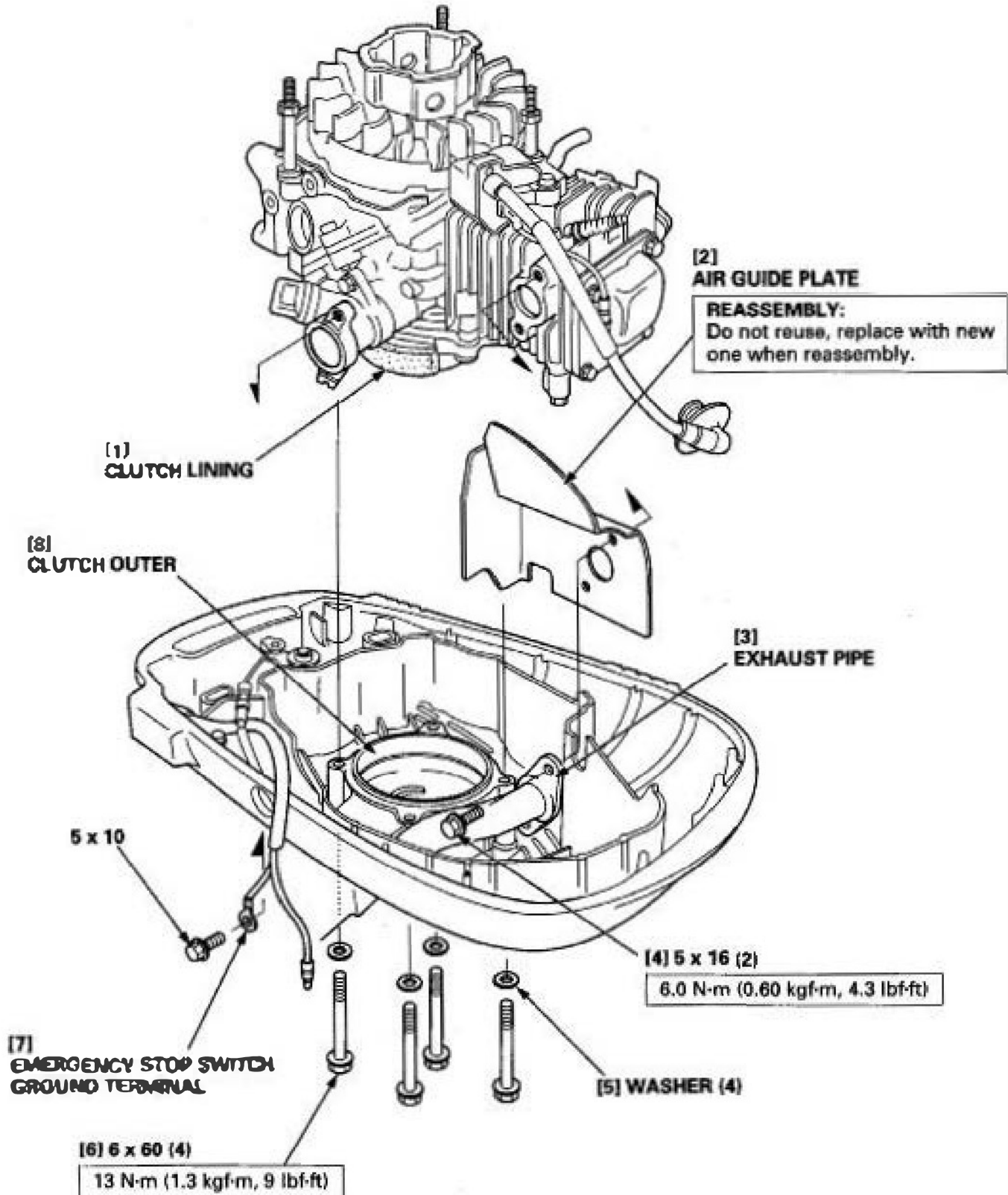


2. ENGINE INSTALLATION

Install the engine in the reverse order of removal.

CAUTION

Take care not to contaminate the clutch lining and the inner wall of the clutch outer with oil and grease.



1. CARBURETOR

1. CARBURETOR

e. REMOVAL/INSTALLATION

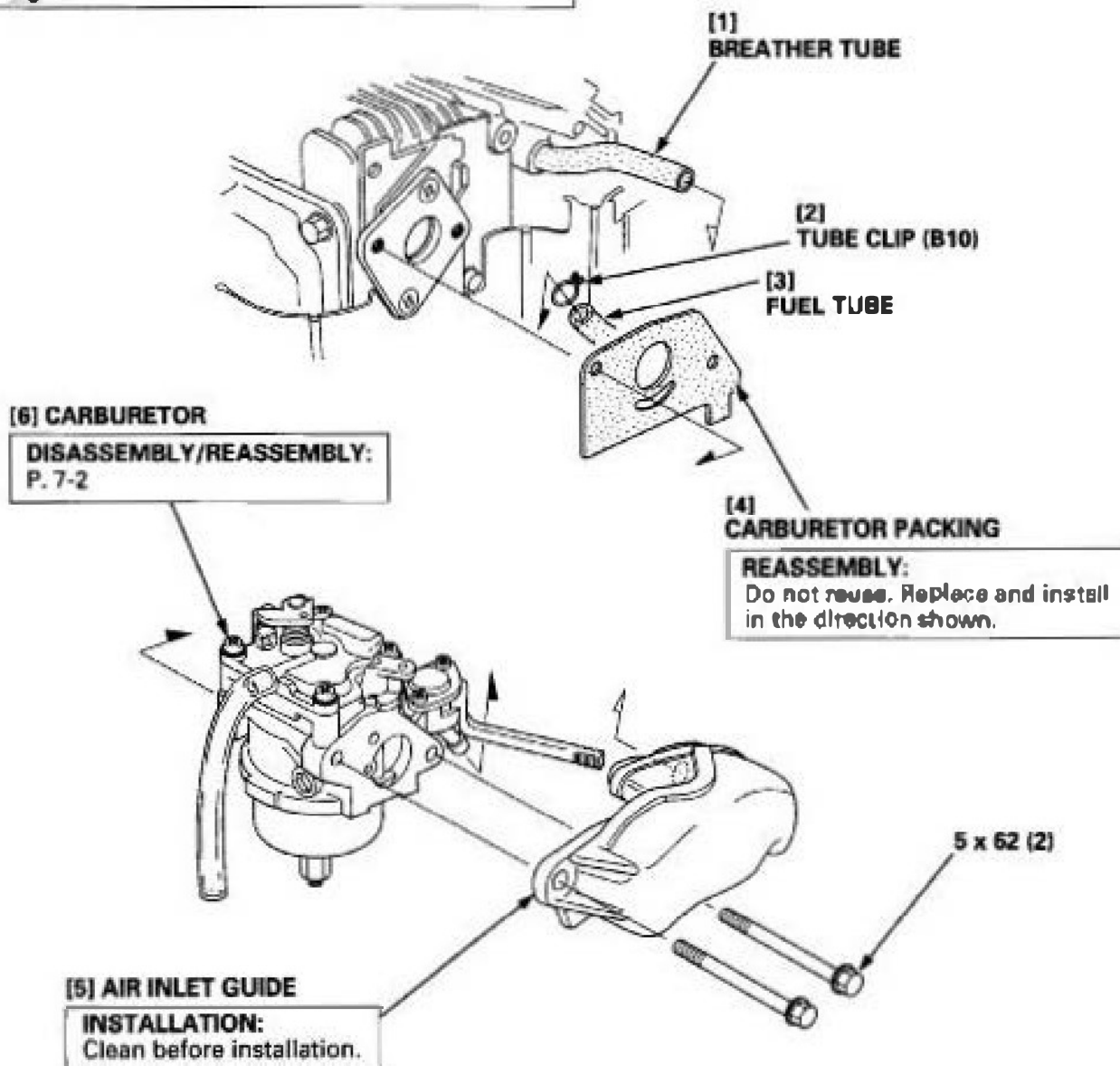
⚠ WARNING

Gasoline is highly flammable and explosive. You can be burned or seriously injured when handling fuel. Keep heat, sparks, and flame away. Wipe up spills immediately.

- 1) Remove the engine cover (P. 4-1) and fan cover (P. 5-1).
- 2) Completely drain the carburetor by loosening the drain screw.

CAUTION

Cover the intake port with a clean tape or film to prevent dirt from entering the engine. If these parts are left out, dirt will enter the intake system, damaging the engine.



b. DISASSEMBLY/REASSEMBLY

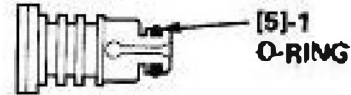
WARNING

- Gasoline is highly flammable and explosive. You can be burned or seriously injured when handling fuel. Keep heat, sparks, and flame away. Wipe up spills immediately.
- Drain the carburetor thoroughly before removing the carburetor.

[5] PILOT JET

REASSEMBLY:

- Clean the passage by blowing compressed air before installation.
- To facilitate installation, apply light coat of oil to the O-ring.



[4] 4 x 12 mm SCREW (4)

[3] CARBURETOR BODY COVER

[2] AIR VENT TUBE

[1] THROTTLE STOP SCREW
ADJUSTMENT: P. 3-5

[24] CARBURETOR BODY

REASSEMBLY:

Clean by blowing compressed air before installation.

[23] PILOT SCREW

ADJUSTMENT: P. 3-5

[6] O-RING

[7] 3 x 6 mm SCREW (2)

[8] LEVER SETTING PLATE

[9] LEVER SPRING

[10] FUEL VALVE LEVER

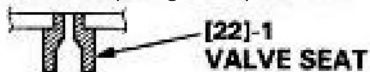
[11] FUEL VALVE PACKING

REASSEMBLY:
Check the packing for wear and damage before installation.

[22] FLOAT VALVE

REASSEMBLY:

Check the valve tip for wear and the valve spring for operation.



[22]-1 VALVE SEAT

[22]-4 [22]-2
NORMAL WORN

[22]-3 FLOAT VALVE

[21] FLOAT PIN

[12] MAIN NOZZLE

REASSEMBLY:

Clean the passage by blowing compressed air before installation.

[12]-1 MAIN NOZZLE

[13] MAIN JET

REASSEMBLY:

Clean the passage by blowing compressed air before installation. Main jet: #85

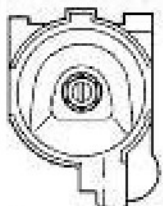
[13]-1 MAIN JET

[20] FLOAT CHAMBER GASKET

[19] FLOAT CHAMBER

REASSEMBLY:

Install in the direction shown.



[18] SEALING WASHER

[15] O-RING

[14] FLOAT

REASSEMBLY:

After installation, check the float operation by pushing the float tip lightly with a finger.
INSPECTION: P. 7-3

[17] SETTING BOLT

[16] DRAIN SCREW

REASSEMBLY:
After installation, check for gasoline leakage.

1.5 N·m (0.15 kgf·m, 1.1 lbf·ft)

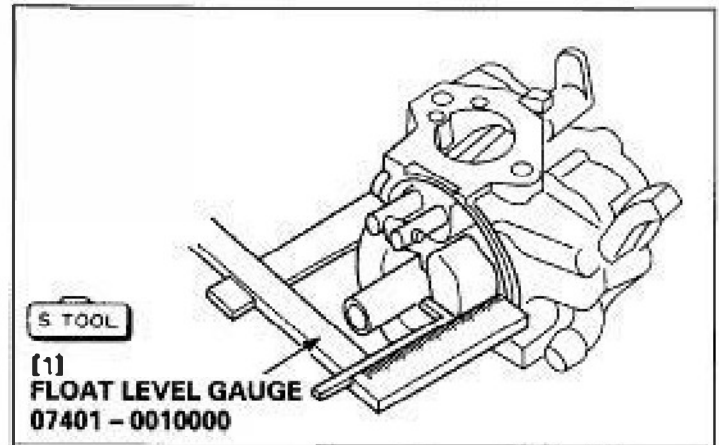
c. INSPECTION

• FLOAT LEVEL HEIGHT

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

Standard float height	12.0 mm (0.47 in)
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If the height is out of specification, replace the float.
Check the float operation.



8. FLYWHEEL/IGNITION COIL

1. FLYWHEEL/IGNITION COIL

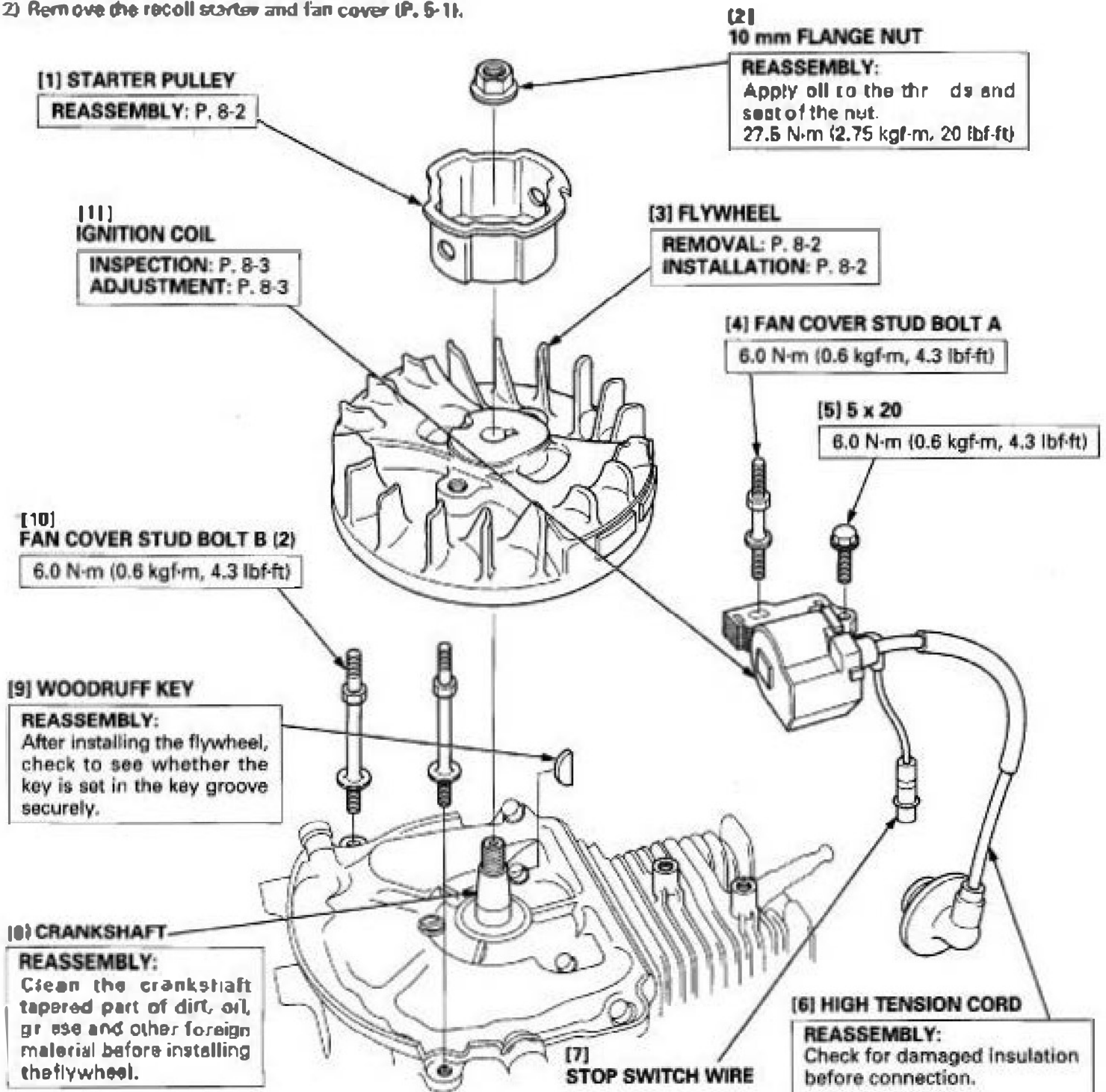
1. FLYWHEEL/IGNITION COIL

a. DISASSEMBLY/REASSEMBLY

CAUTION

Take care not to damage the fan blades during removal and installation of the flywheel.

- 1) Remove the fuel tank (P. 4-2).
- 2) Remove the recoil starter and fan cover (P. 5-1).

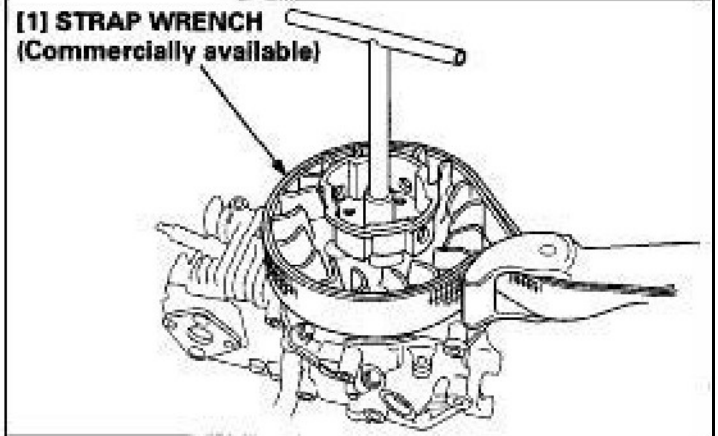


• FLYWHEEL REMOVAL

- 1) Remove the ignition coil.
- 2) Holding the flywheel with a commercially available strap wrench, remove the 10 mm flange nut.

CAUTION

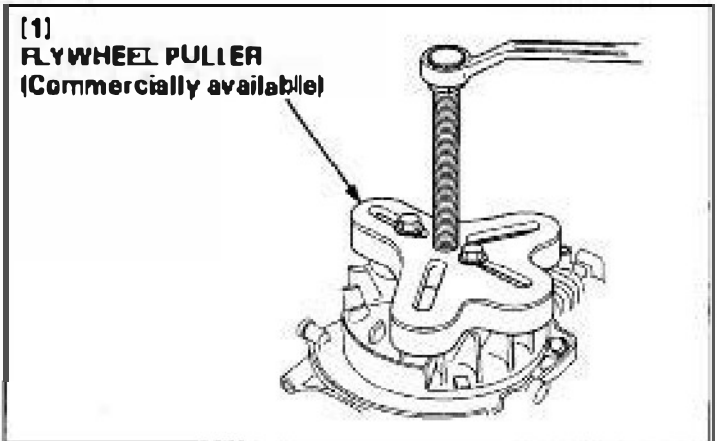
Do not loosen the nut by setting a screw driver or equivalent tool on the fan blade or projection.



- 3) Remove the starter pulley.
- 4) Set a commercially available flywheel puller on the flywheel.
- 5) Screw in the flywheel puller and remove the flywheel.

CAUTION

Do not try to remove the flywheel by striking it with a hammer.

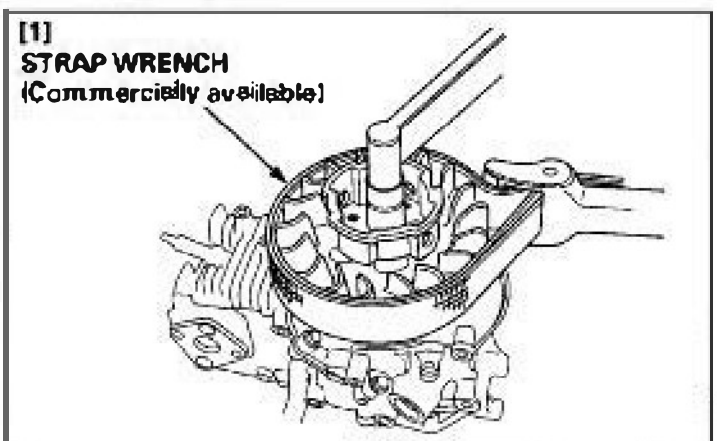
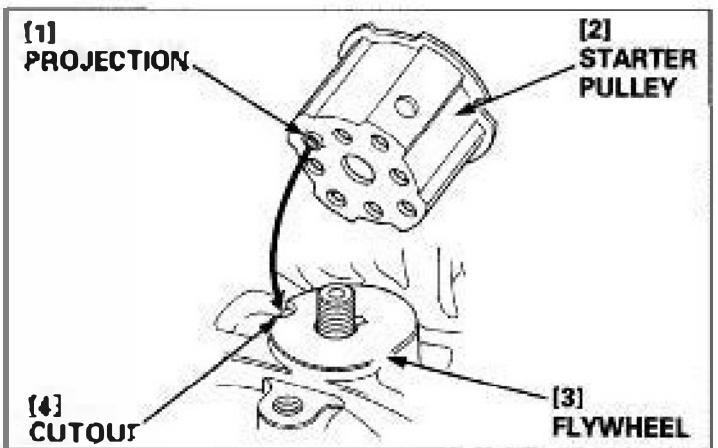


• FLYWHEEL INSTALLATION

- 1) Clean the crankshaft tapered part of dirt, oil, grease and other foreign material before installing the flywheel.
 - Be sure that there is no washer and other foreign material on the magnetic part.
- 2) Set the woodruff key in the key groove securely.
- 3) Install the flywheel over the crankshaft.
- 4) Align the projection on the starter pulley with the cutout in the flywheel, and install the pulley.
- 5) Apply light coat of the oil to the threads and seating surface of the 10 mm flange nut, and loosely tighten the nut. Holding the flywheel with a commercially available strap wrench, tighten the 10 mm flange nut to the specified torque.

TORQUE: 27.5 N·m (2.75 kgf·m, 20 lbf·ft)

- 6) Install the ignition coil and adjust the air gap. (P. 8-3).



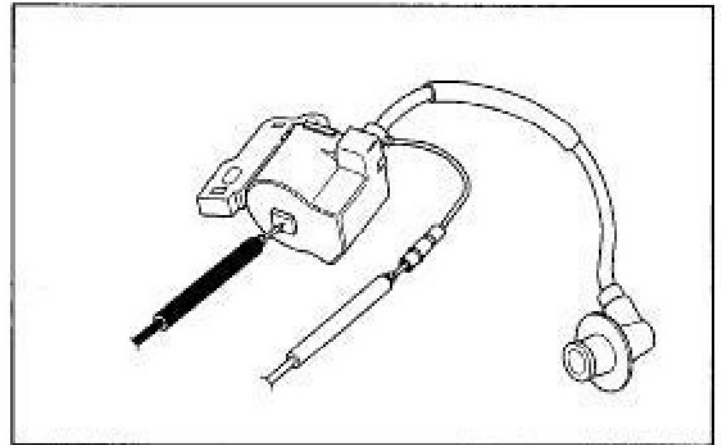
b. INSPECTION

• IGNITION COIL

Primary resistance

Attach one lead of the tester to the lead wire terminal and another tester lead to the iron core, and measure the primary resistance of the ignition coil.

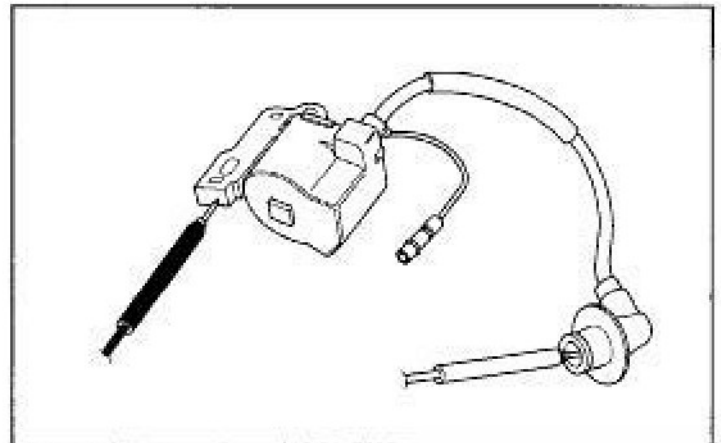
Resistance	0.98 – 1.2 Ω
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Secondary resistance

Attach one lead of the tester to the terminal inside the spark plug cap and another lead to the iron core, and measure the secondary resistance of the ignition coil.

Resistance	11 – 15 kΩ
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c. ADJUSTMENT

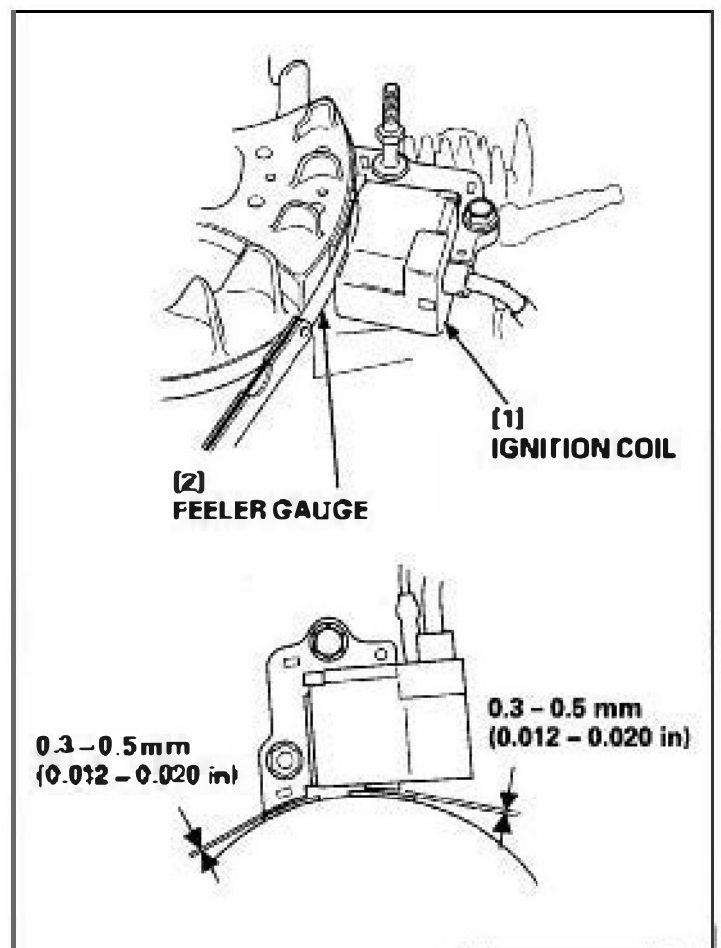
• IGNITION COIL AIR GAP

- 1) Loosen the two ignition coil bolts.
- 2) Insert a feeler gauge of the proper thickness between the ignition coil and the projection points on the flywheel.

To bring the air gap at both ends of the ignition coil equal, set the feeler gauge along the circumference of the unit and adjust the clearance at the both ends simultaneously.

- 3) Pushing the ignition coil against the flywheel, tighten the two bolts and adjust the air gap.

Air gap	0.3 – 0.5 mm (0.012 – 0.020 in)
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1. CLUTCH

1. CLUTCH

a. DISASSEMBLY/REASSEMBLY

1) Remove the engine (P. 6-1).

[1] CLUTCH STAY

REMOVAL: P. 9-2
INSTALLATION:
Clean the crankshaft and clutch stay installation surfaces and install the clutch stay.

[2] CLUTCH ASSEMBLY

INSTALLATION:

- Install with the side marked with the arrow marks toward you.
- Install the 8 mm clutch washers behind the clutch securely.

INSPECTION: P. 9-2

[7] 8 mm CLUTCH STAY BOLT

DISASSEMBLY/REASSEMBLY: P. 9-2
22.5 N·m (2.25 kgf·m, 16 lbf·ft)

[5] S, L, SH, LH TYPE

[6] 8 mm CLUTCH WASHER (2)

[4] EXTENSION SHAFT

8 x 14 (2)

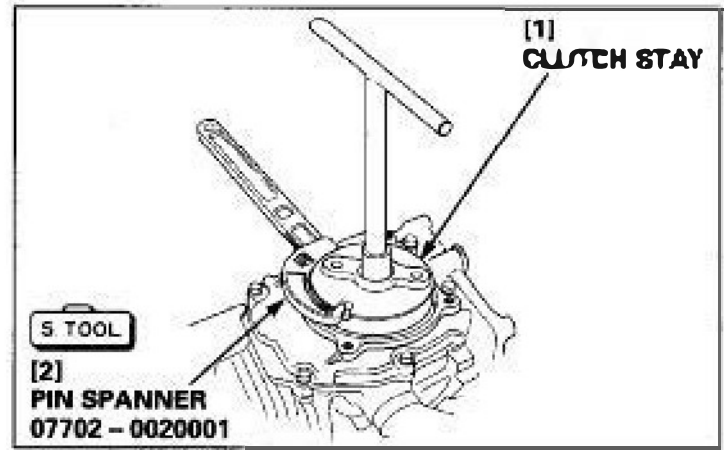
[3] 8 mm CLUTCH BOLT (2)

DISASSEMBLY/REASSEMBLY:
Remove and install the bolts while holding the clutch stay with a pin spanner or holding the flywheel with a commercially available strap wrench.

15.5 N·m (1.55 kgf·m, 11 lbf·ft)

• CLUTCH STAY REMOVAL

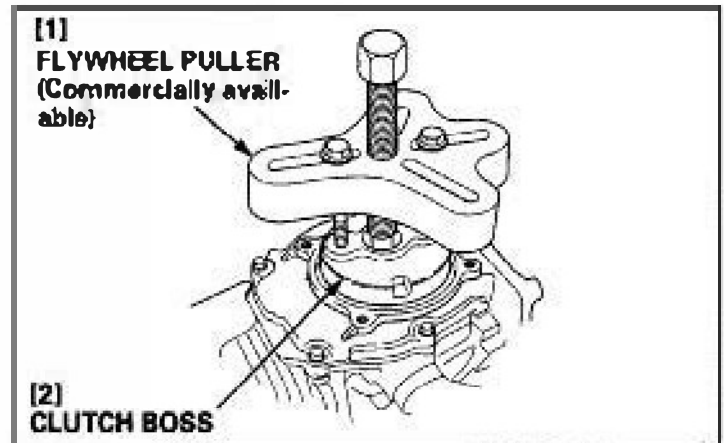
- 1) Holding the clutch boss with the pin spanner or holding the flywheel with a commercially available strap wrench, remove the 8 mm clutch stay bolt.
- 2) Remove the clutch boss using a commercially available flywheel puller.



• CLUTCH STAY INSTALLATION

- 1) Clean the crankshaft and clutch stay tapered part of dirt, oil, grease and other foreign material before installing the clutch stay.
- 2) Install the clutch stay onto the crankshaft and install the 8 mm clutch stay bolt.
- 3) Holding the clutch stay with the pin spanner or holding the flywheel with a commercially available strap wrench, tighten the 8 mm clutch stay bolt to the specified torque.

TORQUE: 22.5 N·m (2.25 kgf·m, 18 lbf·ft)

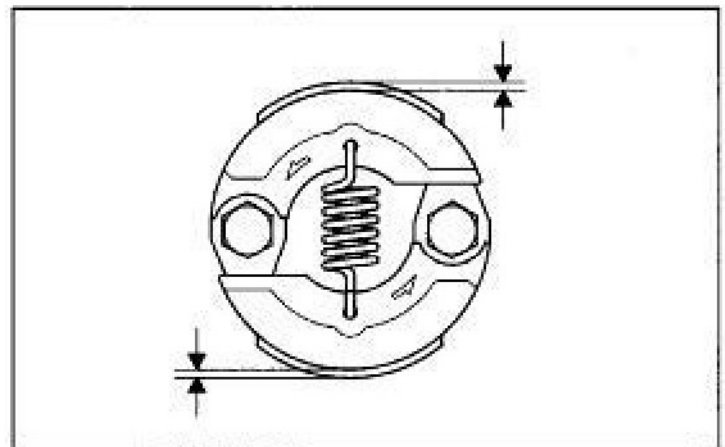


b. INSPECTION

• CLUTCH LINING THICKNESS (ISC, LC, SCH, LCH Type only)

Measure the thickness at the center of the lining (with clutch type only).

Standard	Service limit
2.0 mm (0.08 in)	1.0 mm (0.04 in)



10. CAMSHAFT/ROCKER ARM

HONDA
BF80

1. ROCKER ARM/PUSH ROD

3. INSPECTION

2. CRANKCASE SIDE COVER/CAMSHAFT/
VALVE LIFTER

1. ROCKER ARM/PUSH ROD

a. DISASSEMBLY/REASSEMBLY

[1] CYLINDER BLOCK

INSPECTION: P. 10-7

[2] PUSH ROD (2)

REASSEMBLY:

Check for wear and bend at both ends of the push rod. Install by aligning with the adjustment screw and the concave in the valve lifter securely.

[2]-1

PUSH ROD

[2]-2

CONCAVE

[2]-3

VALVE LIFTER



[3] ROCKER ARM SHAFT

INSPECTION: P. 10-7

[4] 5 x 12 (4)

REASSEMBLY:

Tighten the bolts diagonally in 2 or 3 steps.

6.0 N·m (0.6 kgf·m, 4.3 lbf·ft)

[9] VALVE ADJUSTING
SCREW (2)

[7] ROCKER ARM (2)

INSPECTION: P. 10-6

[6] LOCK NUT (2)

ADJUSTMENT: P. 3-4

[5] VALVE COVER

[8] SPARK PLUG

INSPECTION: P. 3-3
STANDARD SPARK PLUG:
CR5HSB (NGK)
U16FSR-U6 (DENSO)

12 N·m (1.2 kgf·m, 9 lbf·ft)

DISASSEMBLY:

- When removing the valve cover, pry off slowly at each corner of the valve cover.
- Do not remove the valve cover with force. It can deform the valve cover. Replace the valve cover if it is deformed.

INSTALLATION: P. 10-2



• CYLINDER HEAD COVER INSTALLATION

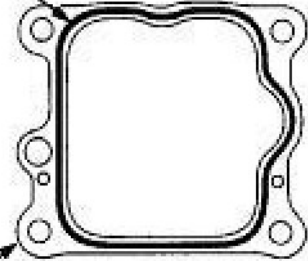
1) Clean the mating surfaces of the valve cover and the cylinder block with a degreasing cleaning agent or a clean shop towel.

2) Apply the liquid sealant (Three Bond 1207B or equivalent) to the position shown on the cylinder block.

Assemble the valve cover within 3 minutes after application of the liquid packing.

3) Wait for 20 minutes after assembly. Do not add oil or start the engine during this period.

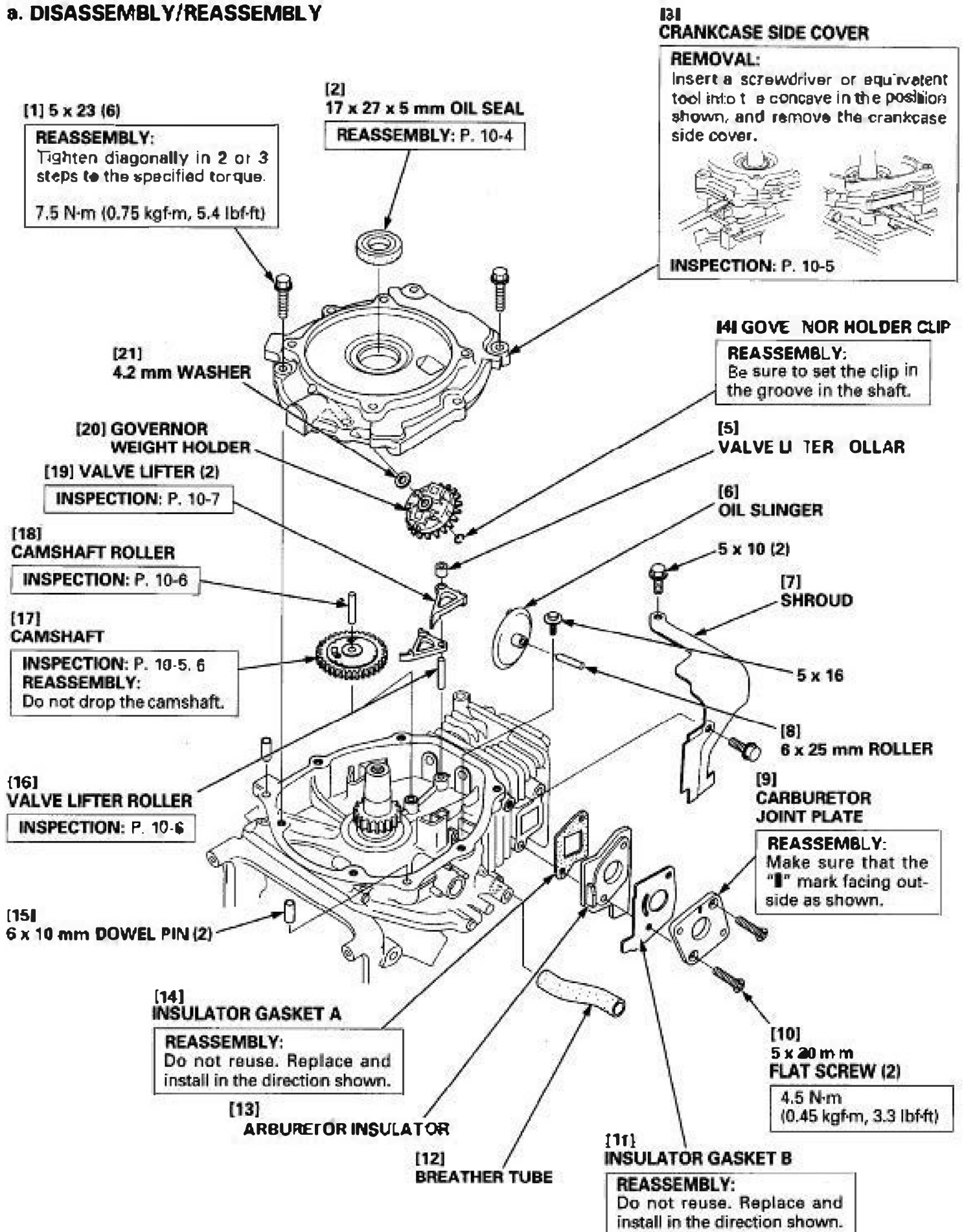
[1]
Liquid sealant application position
Apply a bead about 1.0 mm (0.04 in) in diameter.



[2]
CYLINDER BLOCK

2. CRANKCASE SIDE COVER/CAMSHAFT/VALVE LIFTER

a. DISASSEMBLY/REASSEMBLY



• CRANKCASE SIDE COVER INSTALLATION

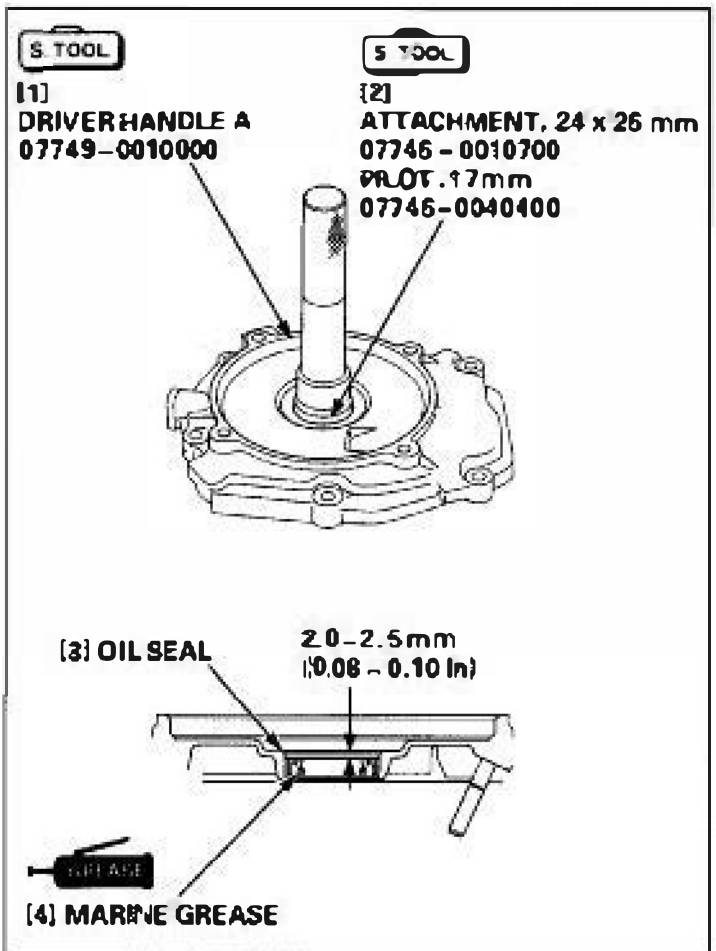
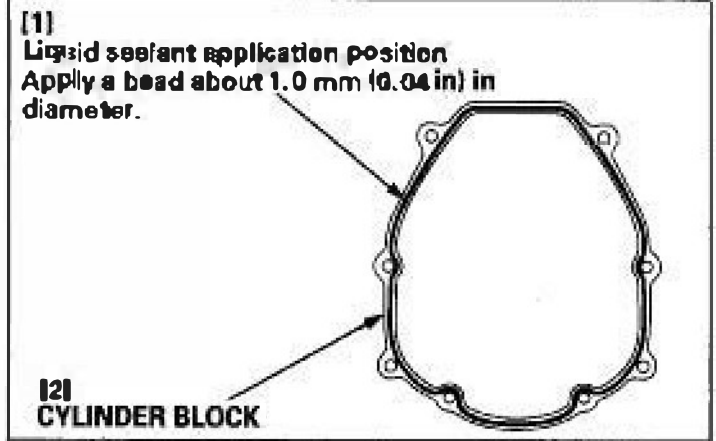
- 1) Clean the mating surfaces of the side cover and the cylinder block with a degreasing cleaning agent or a clean shop towel.
- 2) Apply the liquid sealant (Three Bond 1216E or equivalent) to the mating surface of the cylinder block as shown.
- 3) Install the side cover on the cylinder block. Be sure to assemble within 3 minutes after application of the liquid sealant.
- 4) Loosely install the bolts, then tighten them diagonally in 2 or 3 steps to the specified torque.

TORQUE: 7.5 N·m (0.75 kgf·m, 5.4 lbf·ft)

- 5) Wait for 30 minutes after assembly. Do not add oil or start the engine during this period.

• OIL SEAL INSTALLATION:

- 1) Drive in the oil seal to the specified depth using the special tools as shown.
- 2) Apply marine grease to the oil seal lip.



• CAMSHAFT INSTALLATION (Valve timing adjustment)

Install the camshaft by aligning the alignment mark on the camshaft with the timing mark on the crankshaft.

