

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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HONDA MOTOR CO., LTD.
SERVICE PUBLICATION OFFICE

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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 36.0 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)

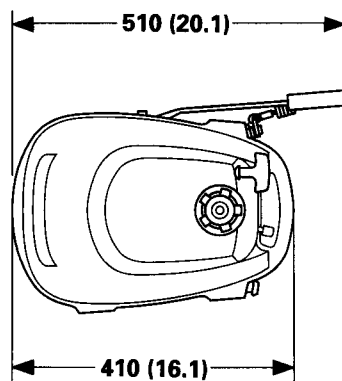
• LOWER UNIT

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)

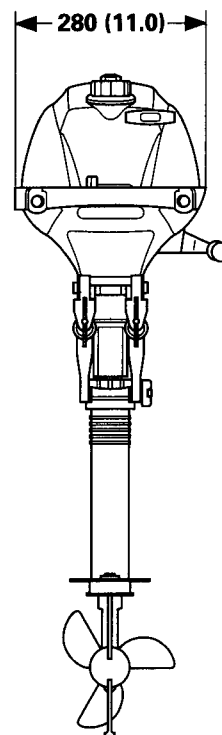
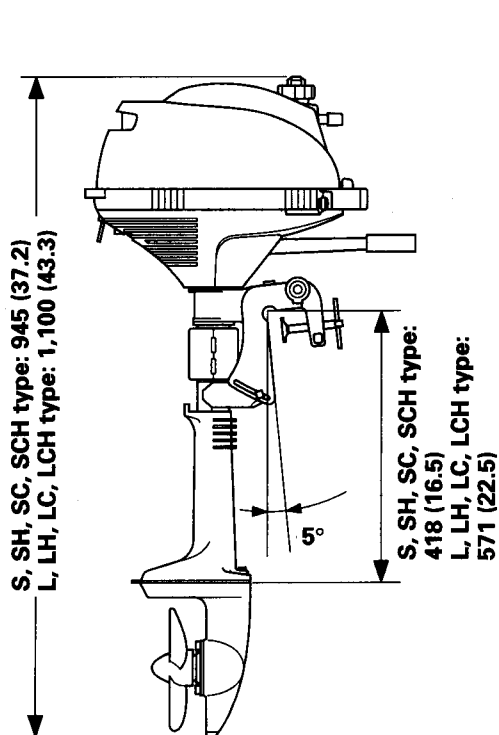
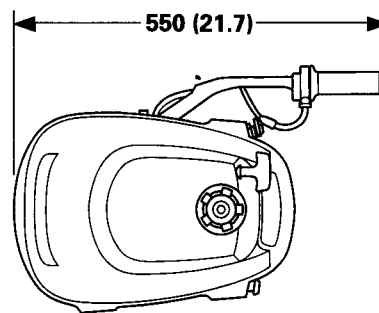
2. DIMENSIONAL DRAWINGS

Unit: mm (in)

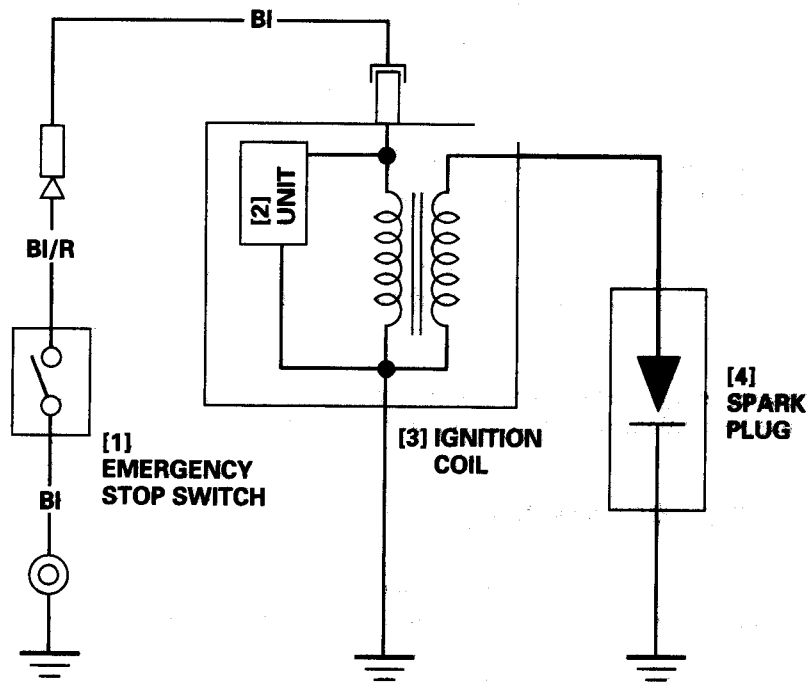
S, L, SC, LC type:



SH, LH, SCH, LCH type:



3. WIRING DIAGRAM



[5]
BI: Black
R: Red

- | | |
|---------------------------------------|----------------------------|
| 1. THE IMPORTANCE OF PROPER SERVICING | 6. TORQUE VALUES |
| 2. IMPORTANT SAFETY PRECAUTIONS | 7. SPECIAL TOOLS |
| 3. SERVICE RULES | 8. TROUBLESHOOTING |
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| 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.

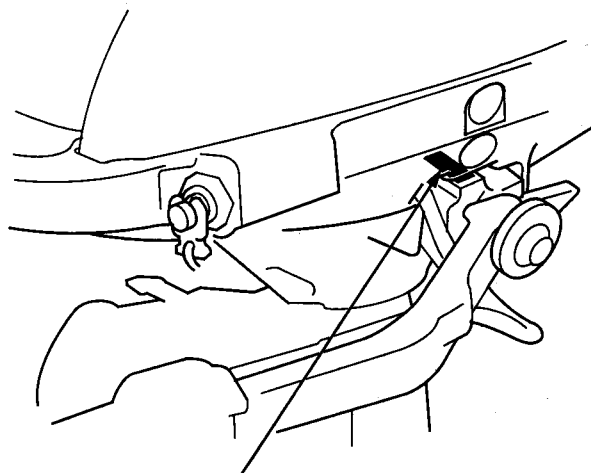
 : Apply oil.

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

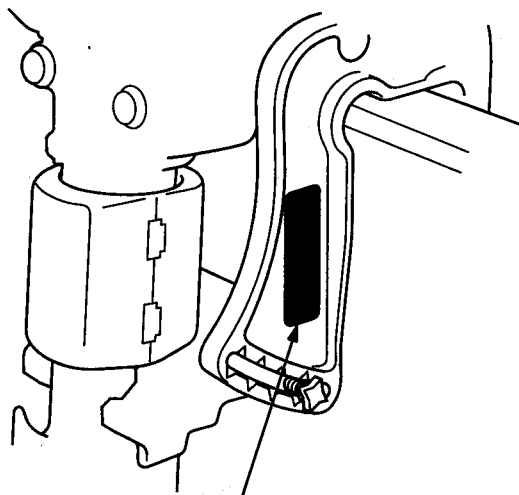
P. ○-○ : Indicates the reference page.

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 (30.09 in)

HONDA

BF2D

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 1.25 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.

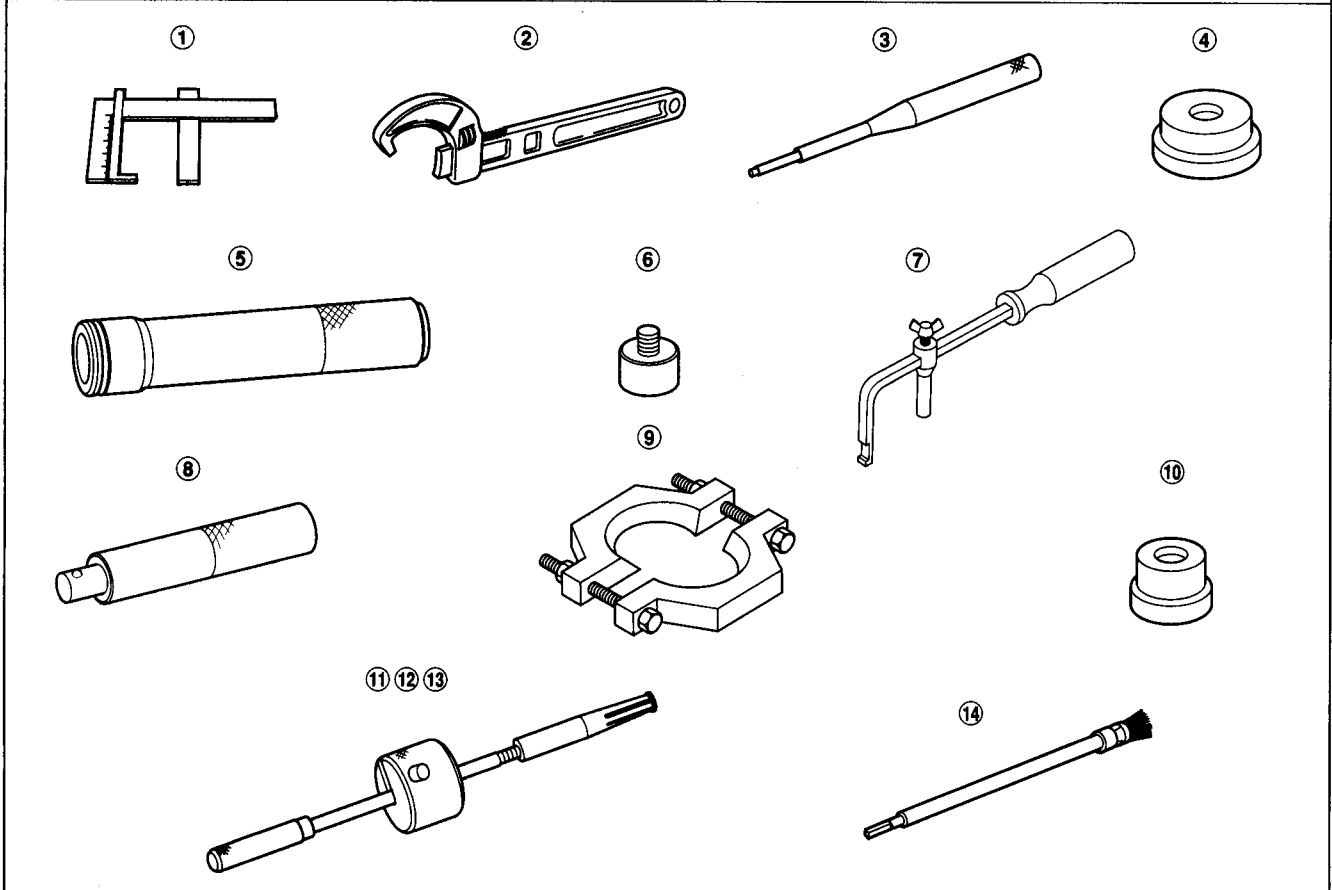
STANDARD TORQUE VALUES

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.

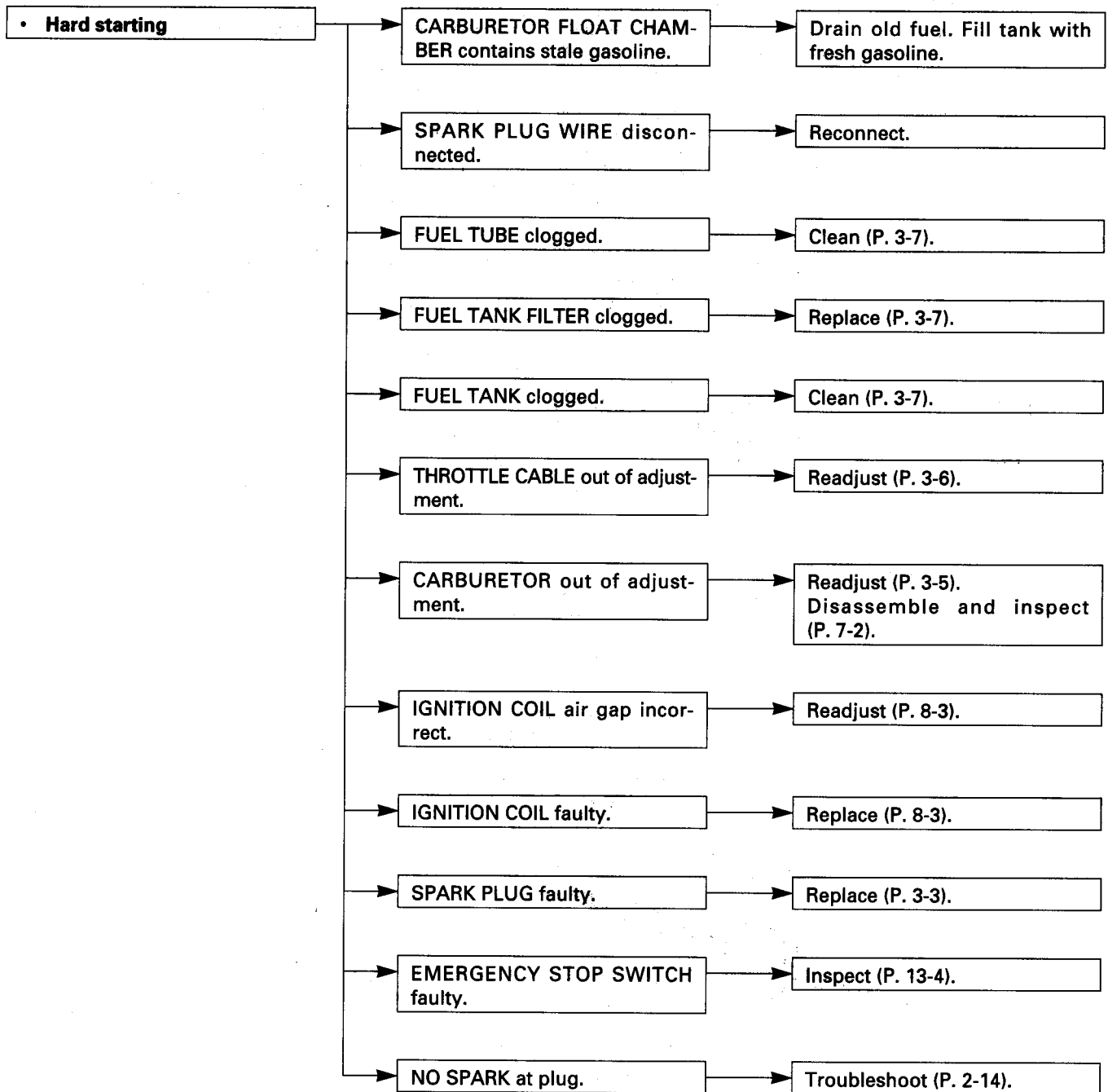
7. SPECIAL TOOLS

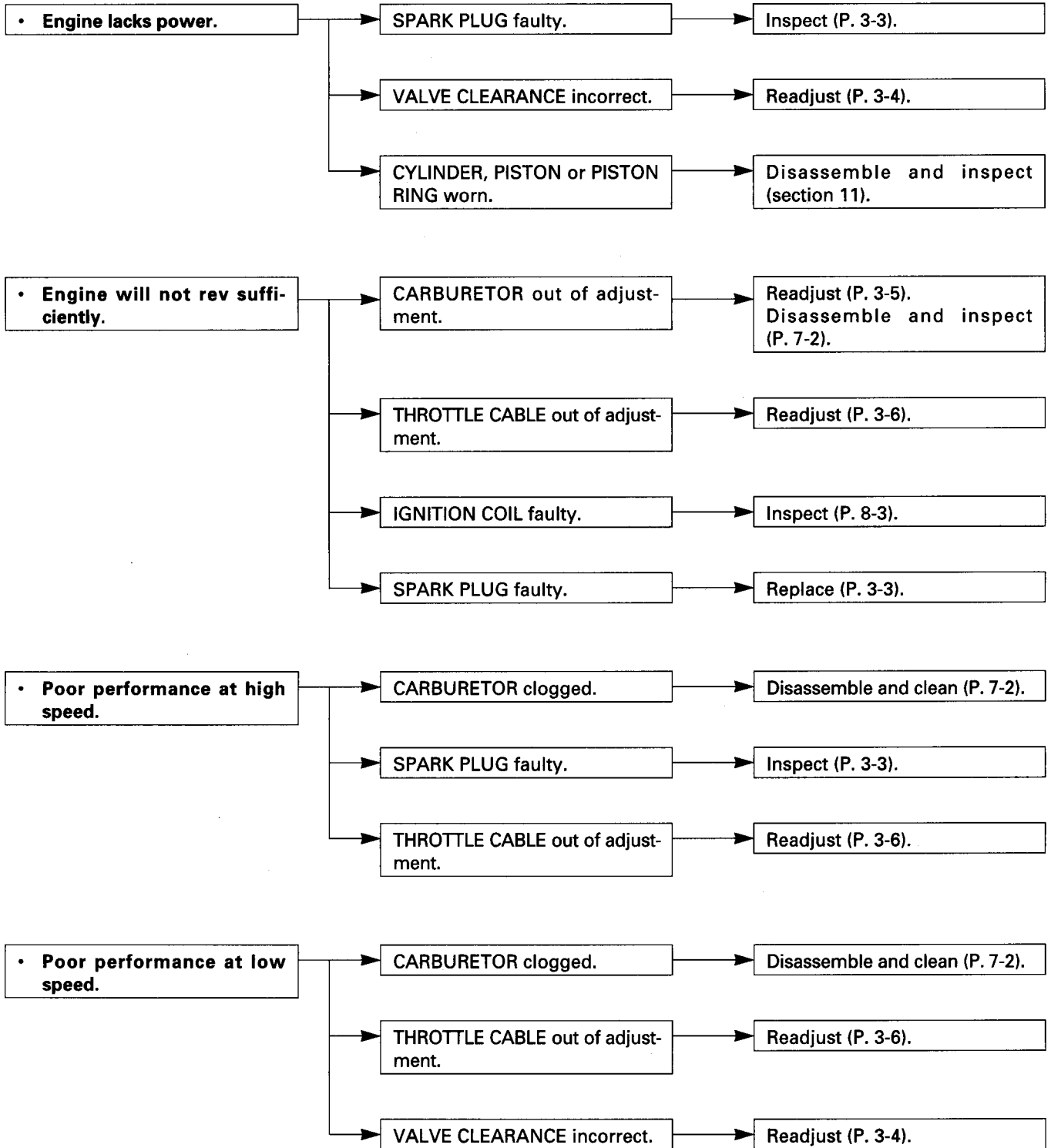
No.	Tool name	Tool number	Application
①	Float level gauge	07401 - 0010000	Carburetor float level inspection
②	Pin spanner	07702 - 0020001	Clutch stay bolt removal/installation
③	Pin driver, 2.5 mm	07744 - 0010100	2.5 mm spring pin removal/installation
④	Outer driver, 24 x 26 mm	07746 - 0010700	Crankshaft oil seal installation
⑤	Inner driver handle	07746 - 0020100	Gear case bearing installation
⑥	Pilot, 17 mm	07746 - 0040400	Clutch outer bearing installation
	Pilot, 10 mm	07746 - 0040100	Crankshaft oil seal installation
⑦	Oil seal remover	07748 - 0010001	Gear case bearing installation
⑧	Driver handle	07749 - 0010000	Water seal removal
⑨	Bearing separator	07631 - 0010000	Used together with the tools ⑥ and ④ or ⑩
⑩	Oil seal driver attachment	07947 - ZV00100	Clutch outer bearing removal
⑪	Bearing remover shaft	07936 - GE00100	Water seal installation
⑫	Bearing remover head, 10 mm	07936 - GE00200	} Gear case bearing removal
⑬	Sliding weight	07741 - 0010201	
⑭	Cleaning brush	07998 - VA20100	Combustion chamber cleaning



8. TROUBLESHOOTING

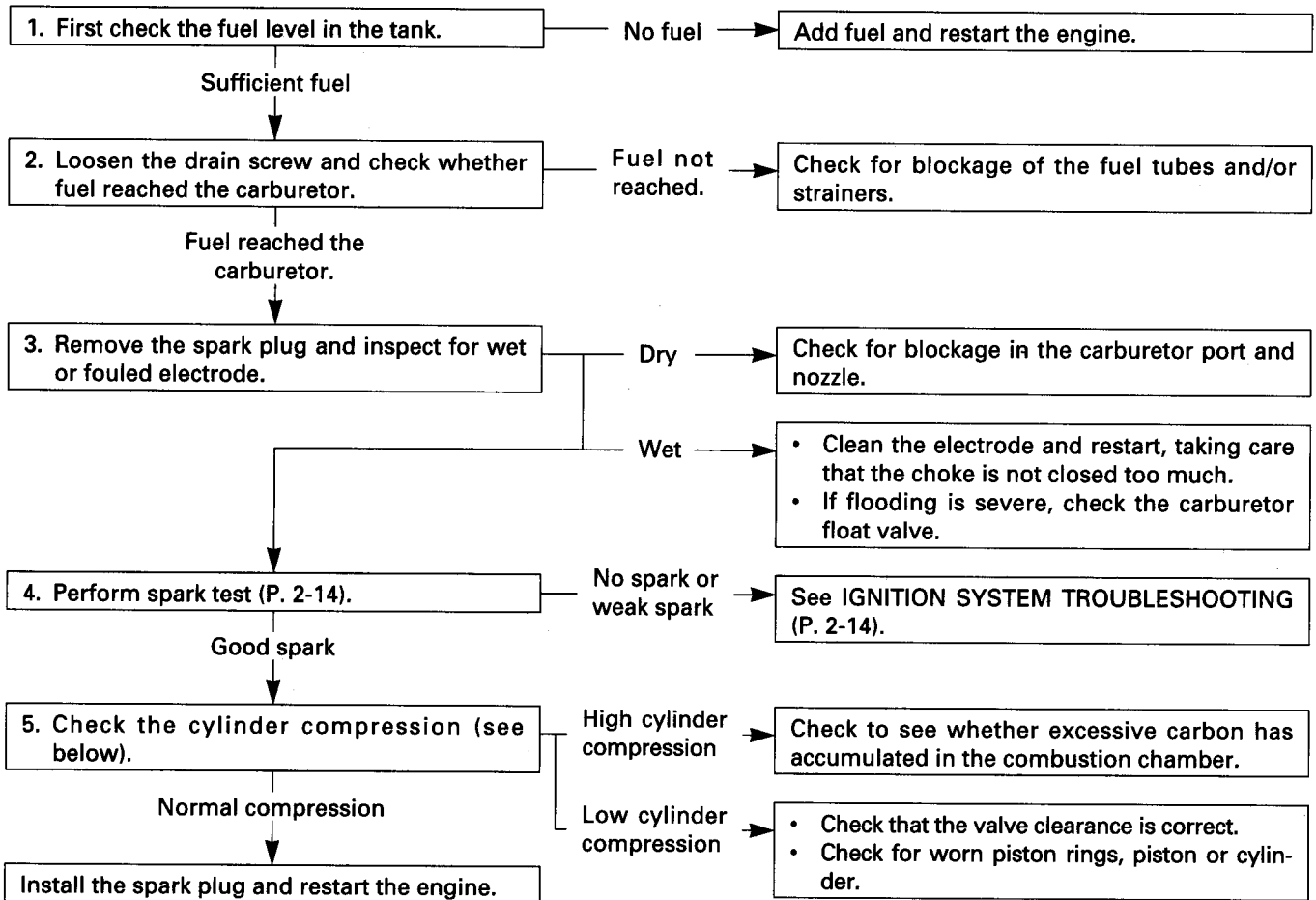
a. GENERAL SYMPTOMS AND POSSIBLE CAUSES





b. ENGINE

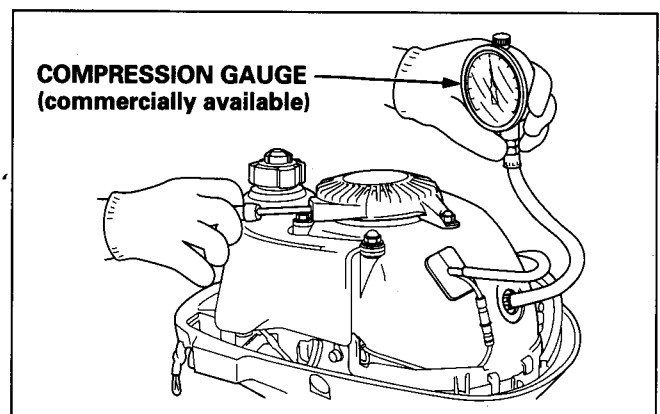
• Hard Starting



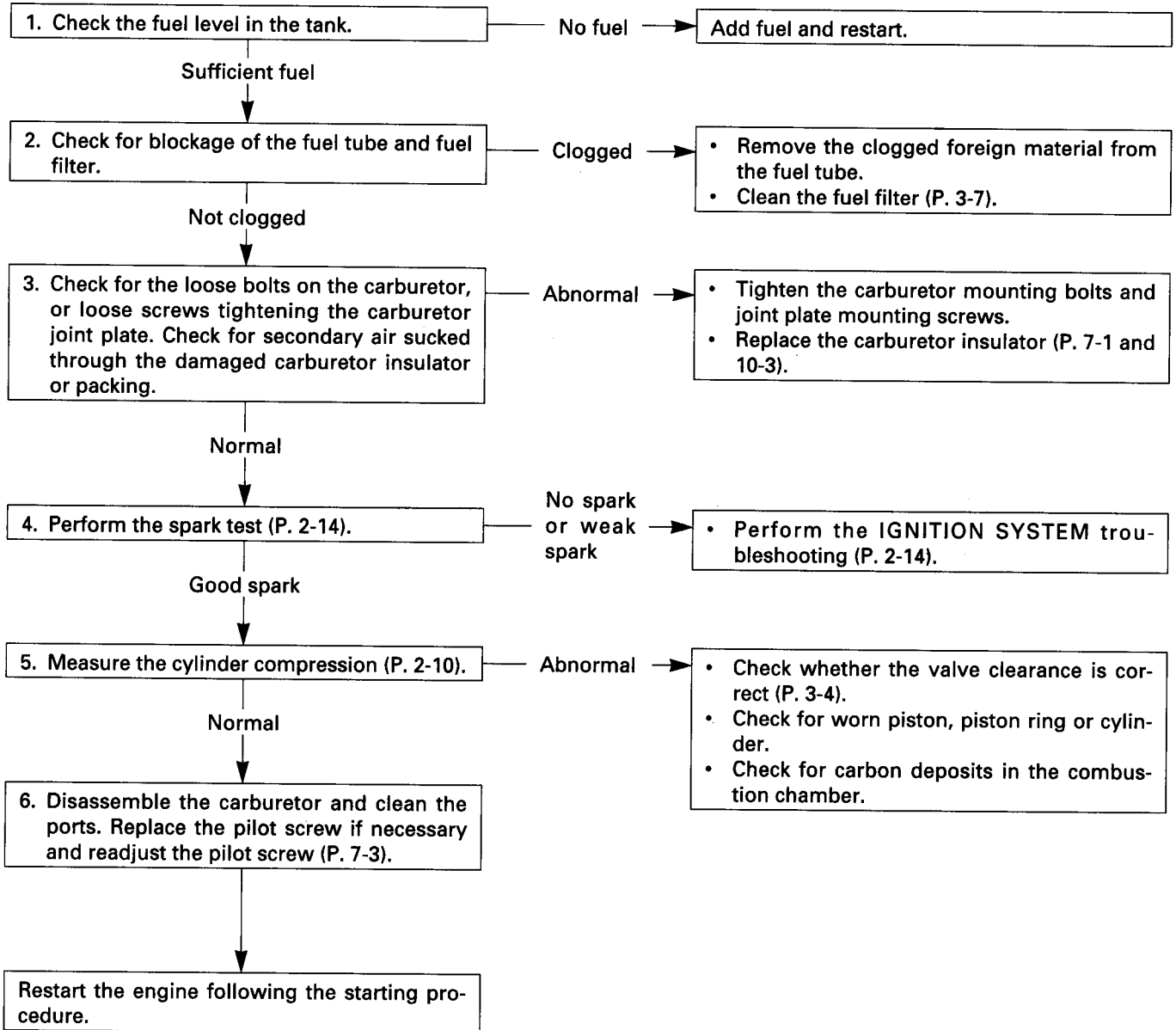
• CYLINDER COMPRESSION CHECK

- 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.

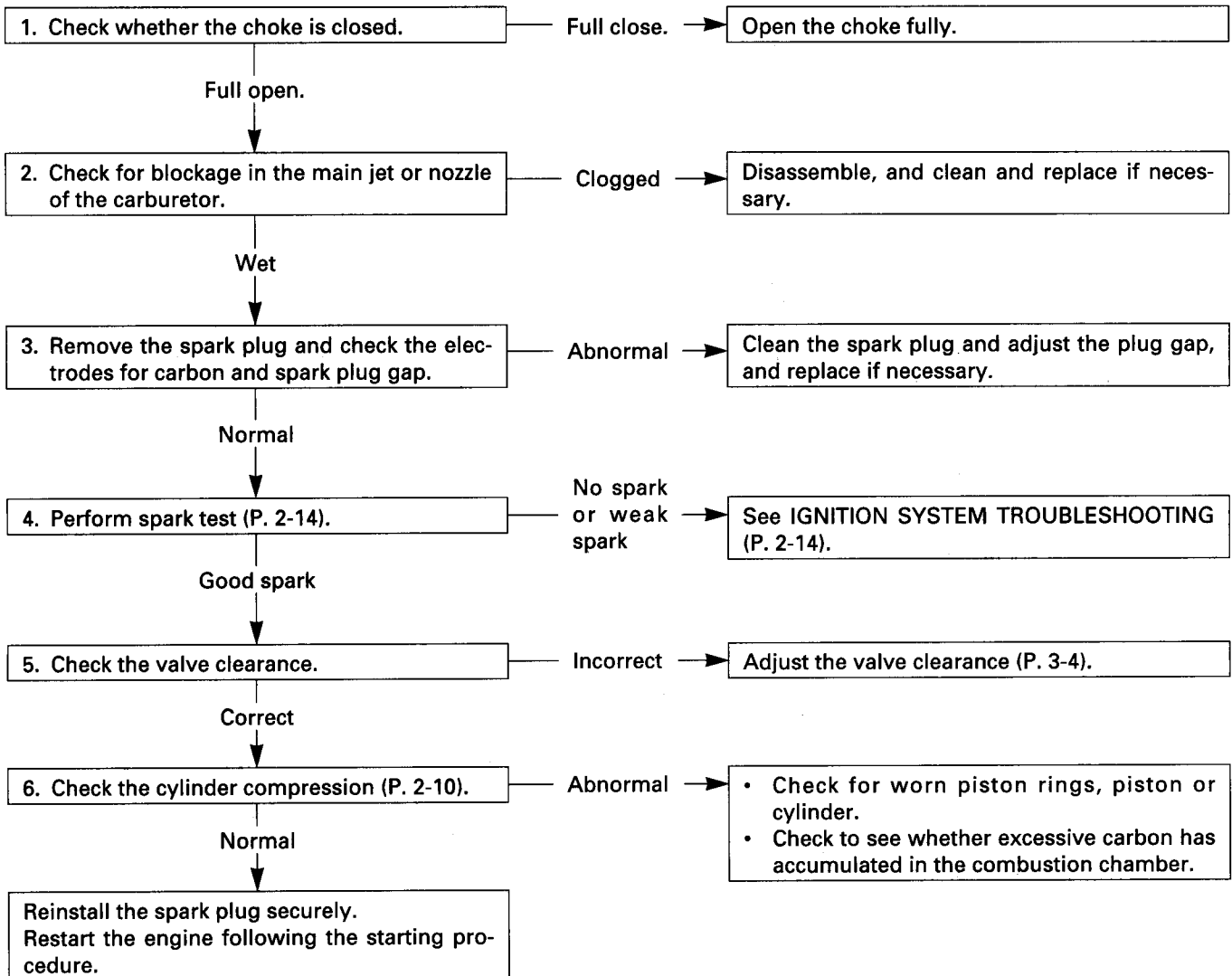
Cylinder compression	0.88 MPa (9.0 kgf/cm ² , 128 psi) at 1,000 rpm
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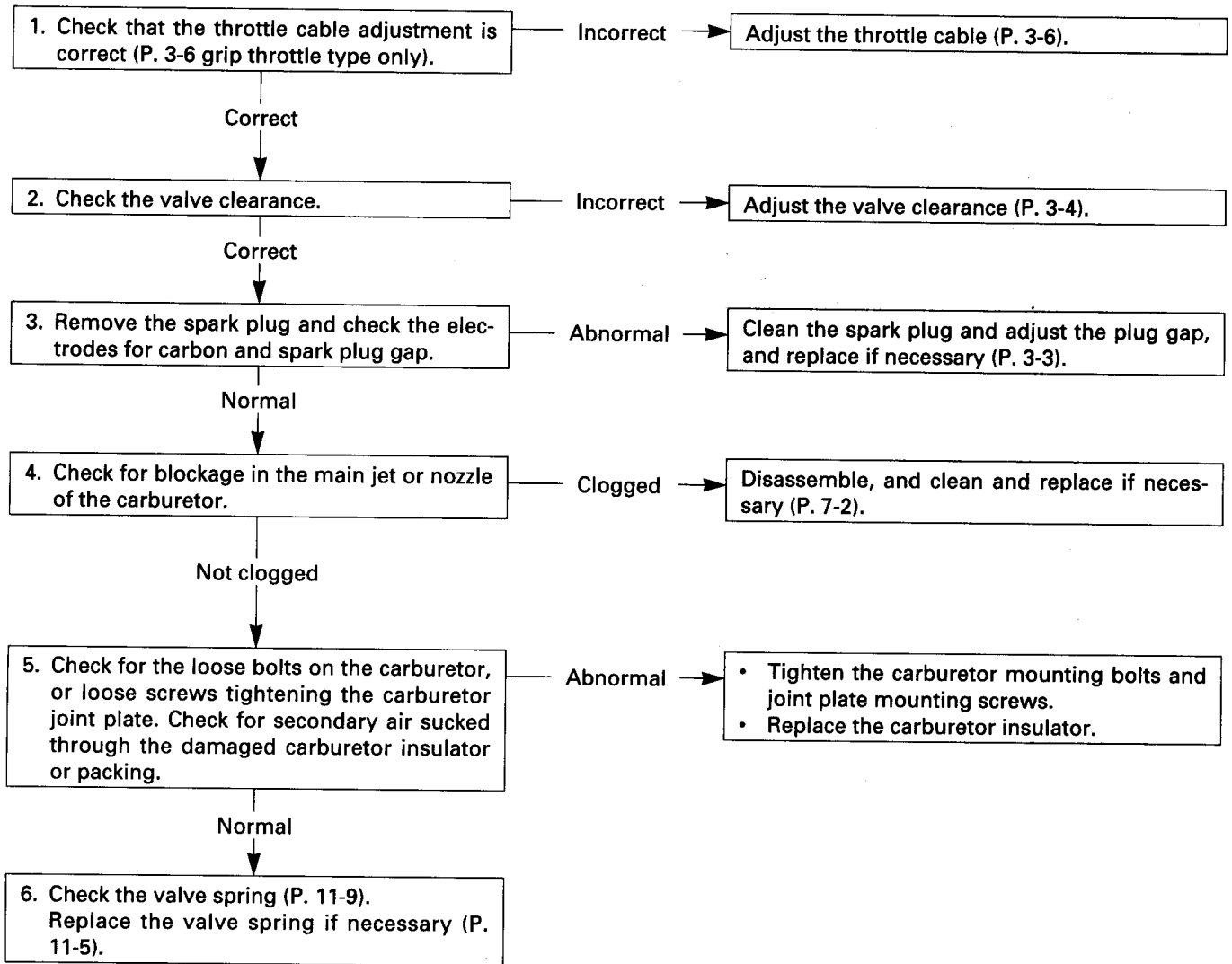
• Engine Starts But Then Stalls



• Engine Lacks Power



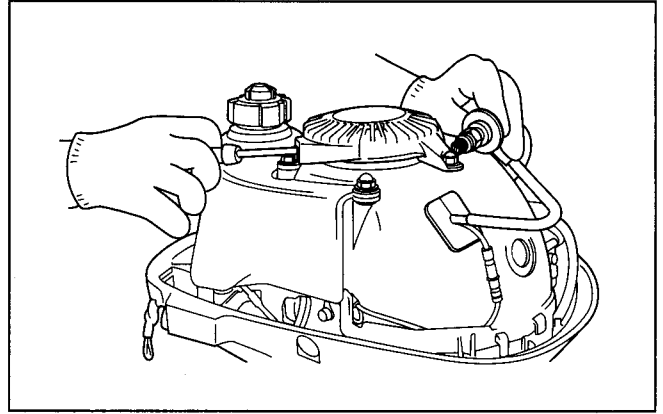
• Engine Speed Does Not Increase



• 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.

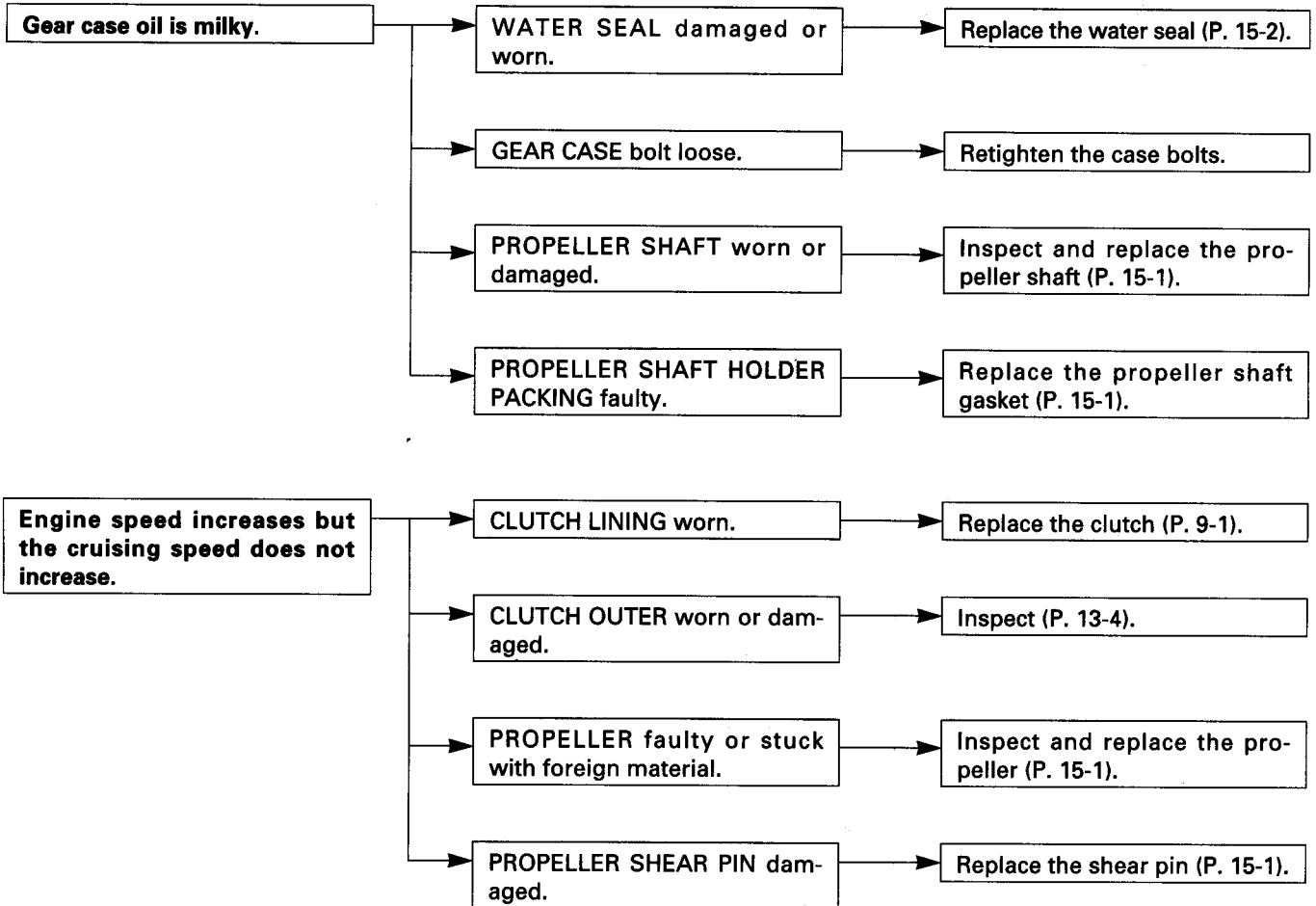
Sparks

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

